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Automatic Thickness Control on Calenders

Roy W. Brown¹

EACH year each of the larger rubber companies applies from thirty to sixty million pounds of rubber compound to fabric. Maximum quality of this rubberized fabric is attained only when the exact desired amount of rubber is applied to each side of the fabric. Tires are built with a number of plies; hence the error of too thick or too thin plies becomes accumulative; thus for maximum quality the thickness of individual plies must be maintained in a highly precise manner.

Conditions and Savings Possible

A typical train calender, where rubber is applied to both sides of the fabric, is shown in Figure 1. These calenders usually have rolls weighing several tons and operate at speeds around sixty yards per minute. Their physical dimensions are such that a number of yards are necessary from the point of admission to the point of completion. These factors, in addition to the human element, place definite and serious limitations on the precision of results possible with hand control. Likewise, the same factors constitute problems, a satisfactory solu-

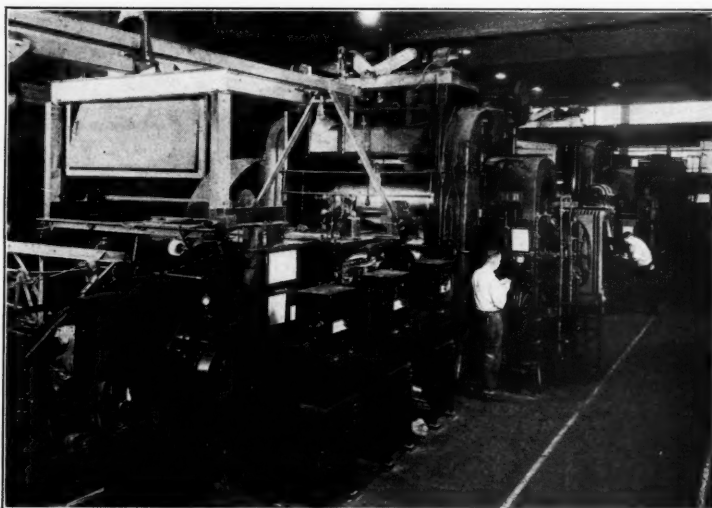


Fig. 1. Typical Train Calender for Applying Rubber to Both Sides of Fabric, with Full Automatic Control of Thickness

tion of which must be arrived at before automatic control can be realized in a practical manner.

It is exceedingly difficult to determine positively the benefits of different controls. Actually, maximum and minimum thickness must be determined over a production run of several days to be certain of relative merits. When calenders are running at a speed of sixty yards per minute, it can readily be appreciated that this problem becomes one of no small magnitude.

In Figure 2 conditions are assumed entirely favorable to the highest skilled manual operation. Actual observation of the use of automatic operation under this condition indicates that the heavy peaks can be reduced at least 0.0005-inch by full automatic control. On a basis of thirty million pounds yearly production, this reduction would result in a savings of approximately one-half million pounds of rubber compound without decreasing quality as represented by minimum tolerance. Since thicknesses above the minimum tolerance can be called waste only, the matter of automatic control quite apparently merits serious consideration.

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Control Requirements

Accurate measurement of the thickness of any compressible material, even when a stationary sample is available, can be realized only with measurement devices so arranged as not to be influenced by the elastic and/or plastic properties of the material.²

A method of continuously and accurately determining the thickness of moving materials has been described elsewhere.³ Experience has proved this system sufficiently rugged and reliable to be used as the heart of an automatic control. It is necessary on account of the comparatively high speeds and time lag involved to gage the material as close as feasible to the point where the rubber is applied to the fabric. This means measuring on the calender roll the thickness of the rubber about to be applied to the fabric. A typical unit operated on the magnetic principle is illustrated in Figure 3. Additional units are applied on the other calender in the train, or in the case of four-roll calenders, on the roll applying rubber to the opposite side of the fabric. Besides an additional unit is desirable to check overall results secured from applying rubber to both sides of the fabric.

The difficulties of adjusting the several-ton roll instantly have been mentioned. Local variations in thickness due to cross threads, roll marks from shut downs, roll eccentricity, and the like must be eliminated in practical automatic control. Also, lost motion in the roll adjusting mechanism must be compensated for in such manner that adjustments resulting in very small differences in thickness can be accurately made.

Automatic Control Operation

To realize these requirements necessitated a type design not heretofore available.⁴ A true integrating device, shown in Figure 4, was designed to add up the average amount off gage during a predetermined time interval and to make an adjustment of the rolls proportionate thereto. Experience indicated the advisability of leaving a small dead spot of ± 0.0005 -inch either side of the desired thickness wherein no adjustment would be made. This dead spot can, of course, be reduced as improvements in calender construction, installation, and operation provide condi-

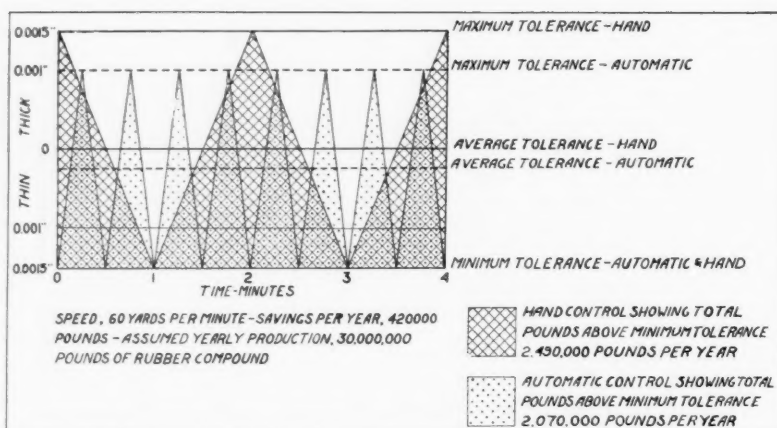


Fig. 2. Illustrating the Savings with the More Frequent Adjustments Possible with Automatic Control, as Compared to Perfect Manual Adjustments on Two-Minute Intervals—A Reduction in Maximum Tolerance of Only 0.0005-Inch Results in Significant Yearly Savings

perfect adjustment for production within tolerance.

The roll adjusting device is arranged so that the magnetic clutch is only partially disengaged between adjustments. In this manner the lost motion of the control mechanism of the calender is "wound up" in whichever direction the succeeding adjustment is to be made. The roll adjusting motor reverses automatically as the magnetic thickness gage crosses the set point from thick to thin; thus the succeeding adjustment is made in the correct direction free from influence of lost motion.

Automatic release is provided to disconnect the automatic control when the calender goes below predetermined speed, thus preventing misadjustment of the rolls when the calenders are slowed down for "threading" and stock replacement or other unusual condition requiring low speeds of possibly five yards per minute or less. This device also serves as the actuating means for continuous indication of speed and yardage as well as totalizing the number of "stops." Starting and stopping a calender result in uncontrollable off gage conditions existing over an appreciable yardage. The "stop" indicator has been quite successful in reducing stoppage to the absolute minimum, thus eliminating the yardage of questionable thickness which results from this cause. The operator in Figure 1 is observing this portion of the equipment.

The complete calendering operation consists of a large number of individual operations, any one of which may go wrong and interfere with normal operation or necessitate shut down. Since any automatic device can only be made to perform in a predetermined manner with a known sequence of operation, it is imperative to disconnect the automatic control when such interference with normal operation occurs. Besides the slow speed disconnection mentioned above the magnetic thickness measuring elements are mounted on a counterbalanced support and arranged to disconnect the automatic control when they are pushed away from the calender

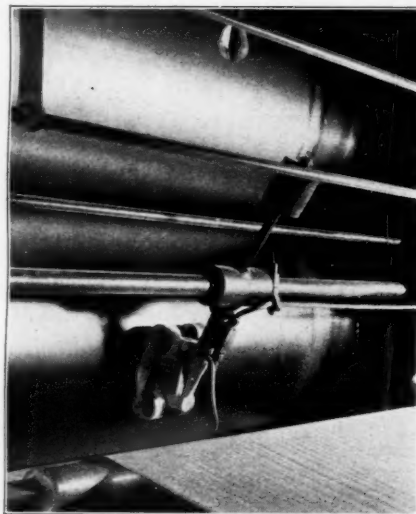


Fig. 3. The "Heart" of the Control System Which Makes Continuous Precise Thickness Measurements of the Rubber Ply Immediately Prior to Application on the Fabric

² "Thickness Measurements of Compressible Materials," *INDIA RUBBER WORLD*, July 1, 1927, pp. 197-98.

³ "Thickness Measurements of Calendered Materials," *Ibid.*, Nov. 1, 1933, pp. 35-37.

⁴ United States patent No. 1,989,038.

roll either by hand or by an accidental lump of the material being calendered.

Push button transfer switches are also provided on the lower portion of the instrument cases shown in the foreground of Figure 1, so that the calender rolls can be adjusted through the remote control mechanism by manual manipulation of the raise and lower push buttons. An additional single lever switch is provided in this portion of the case to disconnect all electrical supplies, which enables the hand operation of the calender in the conventional manner without interference with any of the automatic control equipment.

Thickness vs. Weight

Much consideration has been given the square yard weight of calendered fabric as a substitute for, or a supplement to, its thickness. While weight must be considered, dimensional thickness is the factor which determines the overall dimensions of a number of plies, which in turn determines the properties of a product such as tires. If the rubber material is added to the fabric so as to enfold completely the fabric threads or cords, a specified thickness will result in a fixed square yard weight if the specific gravity of the rubber compound being applied remains constant. It is hardly logical to hold the calender responsible for variations in specific gravity of the rubber compounds.

Modern though present-day calendering may claim to be, it is extremely rare that samples are not cut from the material being calendered and the thickness determined by means of a dial micrometer—this irrespective of continuous gaging or weighing devices.

An additional property of rubberized fabric, its dielectric strength, has also been used as a substitute for thickness or weight measurements. Unfortunately the dielectric properties tend to vary appreciably in practical usage with factors other than specific gravity; hence use of this method introduces possibility for still another source of error of very appreciable magnitude.

Scales used to weigh continuously running sheets to

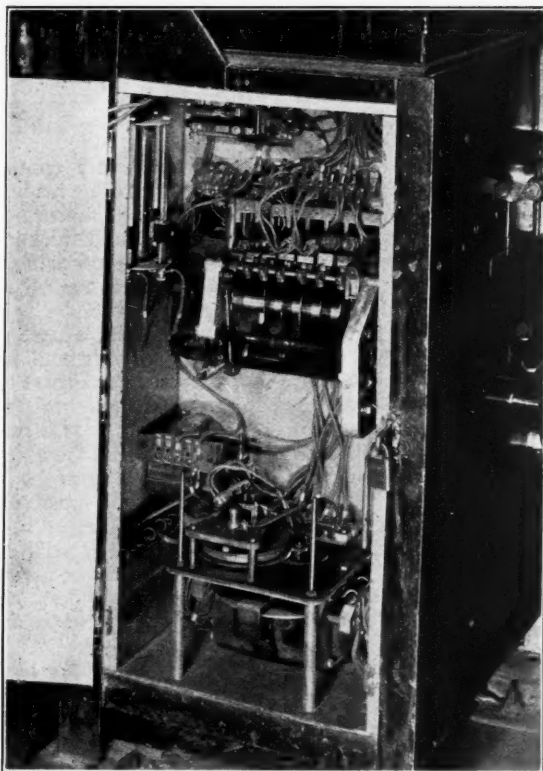


Fig. 4. The "Brains" of the Automatic Control Totalize Variations in Thickness Over a Period of Time and Make the Roll Adjustment Proportionate to the Average Amount Off Gauge

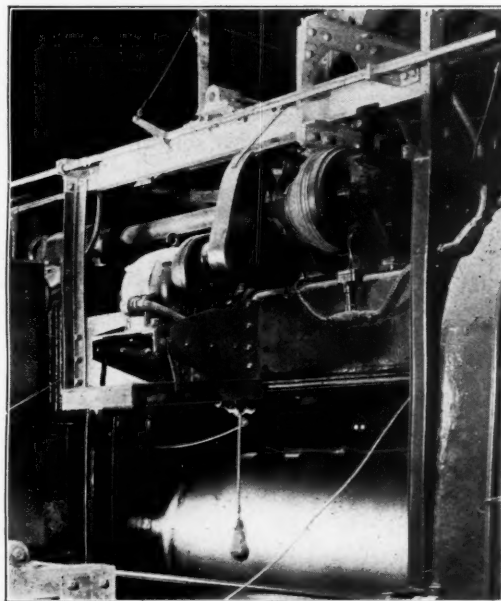


Fig. 5. The "Arm" Which Supplies the Energy Necessary to Move the Heavy Roll the Amount Required to Correct Any Off Gauge Condition

date have lacked sufficient accuracy, damping, sensitivity, and the ruggedness essential to secure precision of weighing necessary to reduce maximum tolerances by an amount equivalent to 0.0005-inch thickness. Another serious limitation to the weighing method is the inability to apply it directly to the rubber compound on the calender roll at the point immediately preceding the point of application to the fabric, which must be done for full automatic control.

Operating Considerations

Temperature of the rubber stock as it is being applied to the fabric provides a source of error for all measuring methods. Consequently attention to the control of temperature is essential for the attainment of the highest degree of precision in the finished product.

Temperature also affects the plasticity of the stock, which in turn adds or removes load from the calender roll, resulting in change of their effective spacing, due to elastic deformation of the rolls, roll necks, bearings, and frames. Therefore the practical solution is, of course, to apply the feed to the calenders at as near a constant temperature and constant plasticity condition as is possible.

The bank of rubber stock at the roll nip also affects the load on the rolls. The bank, plasticity, and the temperature of the feed stock can best be controlled through automatic feed and conveyor to the warm-up mill.

Variation in operating speed, including starting and stopping, also causes changes in the loading on the calender roll with resultant variation in thickness. Selection of a speed which can be continuously maintained will result in a surprising increase in the average thickness uniformity of calendered material.

An appreciable yardage is represented in the fabric from the entering point to the exit point; therefore attention must be given the tension necessary to move this fabric through the complete sequence of the calendering operation. Since sheets are occasionally torn entirely in two, it is logical to assume that variation in tension does occur

to a sufficient extent to affect appreciably the thickness. This is found to be the case especially in starting, stopping, and changing speeds.

In cord fabric, where very light or no cross threads are used, varying tensions will appreciably affect the width as well as thickness. Thus the ratio of rubber compound to fabric changes and the relation between thickness and square yard weight are affected. Variation of this type does not alter the overall dimensions of the finished product, such as tires, if thickness is maintained, but does, of course, affect its quality due to the change in the fabric-rubber compound ratio.

Even the best calenders available require appreciable clearance in the roll neck bearings as well as clearances between the bushings and the vertical slides in the frame. This, in addition to elastic deformation of the various parts, results in a change of the relative position between, say, the middle and the lower roll when an adjustment is made between the upper and the middle roll, thus requiring succeeding and compensating adjustment between middle and lower roll. This condition has been found to limit very seriously the precision attainable with four-roll calenders. Where two three-roll calenders are used in tandem, the adjustment on one calender does not, of course, affect the adjustment on the other calender. In the case of the single four-roll calender, however, adjustment of one roll affects, to some extent, all other rolls. Hence it is extremely difficult for the operator with hand control to keep the calenders adjusted so that the exact desired amount of rubber compound is applied to each side of the fabric. It is hoped that modern materials will enable improvement in the construction of calenders which will eliminate this undesirable condition.

Hand Control vs. Automatic Control

Consideration of the large number of factors which

influence thickness, as outlined under the preceding section, indicates the physical impossibility, even with the most skilled and experienced personnel, of making manual adjustments in sufficient number and at the correct time to compensate for the large number of varying conditions.

With automatic control a much larger number of adjustments can be made, and the timing of these adjustments can be improved, with the net result that an appreciably small thickness tolerance can be maintained and that an appreciably larger percentage of the total stock produced can be maintained within the specified smaller tolerance.

Comparatively simple, extremely rugged apparatus is necessary to withstand the difficult conditions surrounding the calender operation. Earlier experimental equipment, while successful from a mechanical and electrical viewpoint, failed in a practical sense on this account.

In starting up, the automatic control constitutes a definite advantage since the device can simultaneously adjust the several rolls involved to get the calender train adjusted to the correct values much quicker than can be done by hand, even when two operators are available. The ability to make accurate adjustments simultaneously on different calenders or on different rolls of the same calender constitutes a definite advantage especially important in the case of a single four-roll calender being used to apply rubber to both sides of the fabric instead of the more conventional use of two three-roll calenders in tandem.

If the full automatic thickness control equipment is correctly designed, installed, and maintained, it will assist the operator better to handle the complex calendaring operation. If it does this work, it will be a success both from an operating point of view and from the point of view of minimizing waste through the realization of smaller thickness tolerances.

Gutta from South Africa

THE technical value and commercial possibilities of a new South African gutta¹ are of interest because of the limited supply of the well-known superior trade quality from the gutta percha trees (*Palaquium*) of Java.

Samples of the bark, twigs, and leaves of *Gymnosporia acuminata* Szyzs. collected in Swaziland were forwarded to the Imperial Institute by the Principal Botanist, Department of Agriculture, Union of South Africa. *Gymnosporia acuminata* is a shrub or small tree seldom growing more than twenty feet high. It occurs throughout the forest and scrub districts of the Cape from the coast up to 6,000 feet. In some mountain patches it is one of the most abundant species. It is also found in Natal, the Transvaal, and the Orange Free State.

The material received was in two portions consisting of (1) bark and (2) twigs and leaves. Representative portions of each sample were ground and extracted with acetone in a Soxhlet apparatus.

The extract, after removal of the residual acetone by evaporation, was further extracted by benzene. Calculated on moisture-free original sample, the benzene extract from the bark was 11.8% and from twigs and leaves 3.9%. The benzene extract from the bark was very pale brown or dark cream color and almost entirely soluble in benzene. Fine shreds of it were treated with

boiling alcohol under a reflux condenser to remove any resins still present. The residual material, which was unchanged in appearance, was found to be no longer readily soluble in benzene, though it swelled up in this solvent. The material was fairly hard and had the general appearance of raw rubber, but lacked its elasticity. When boiled with water, the material softened and became plastic, becoming fairly hard again on cooling. When burnt, an odor resembling that of burning rubber was emitted. After vulcanization a buff-colored, very tough, and somewhat elastic product was obtained.

The benzene extract of the twigs and leaves was similar to that obtained from the bark, except that it was pale green in color (owing probably to the presence of chlorophyll) and was no longer readily soluble in benzene. Like the benzene extract of the bark, it swelled up in benzene after treatment with boiling alcohol. No vulcanization trial was carried out on this material.

In appearance and properties the benzene extracts of both samples resembled gutta percha or balata. The yield of 3.5% of a gutta-like material from the sample of twigs and leaves compares very favorably with that stated to be obtained in the East from the leaves of gutta percha trees (*Palaquium* spp.), it being recorded that on the government estates in Java a yield of 2.7% is obtained. On this basis the yield of 10% from the sample of bark may be regarded as very satisfactory.

¹"A New Gutta from South Africa." *Bull. Imperial Inst.*, Oct., 1935, pp. 303-306.

²*Gummi-Ztg.*, 22, 1093 (1908).

Labor Nationalities on the Rubber Estates

Everett G. Holt

WHEN the rubber plantation industry started, around 1900, the existing tea and coffee estates in Ceylon and Malaya customarily employed labor brought from British India, and the rubber estates naturally adopted this practice. In those days labor was recruited by village headmen, known as kangany, who furnished the estates with labor under contract for a certain period. For a laborer to break the contract with an estate was then a penal offense. This system, by which South Indian labor (chiefly Tamils) was supplied to early rubber estates, continued in vogue until about 1921; but as time passed, the kangany became a professional recruiter of labor in South India, rather than a local headman there, and a practice which developed of making monetary and other advances to the kangany for supplying labor, and charging such advances against subsequent wages of employes, had led to very serious abuses. The system was radically changed, and nowadays kangany are estate representatives for recruiting; advances to them are not chargeable against wages, and labor contracts for any period longer than one month are not valid. Upon a month's notice, consequently, South Indian employes are free to quit any estate and seek employment elsewhere.

Labor Sources for Principal Countries

South Indian labor was supplemented in Ceylon by the native Singhalese, and in addition a large local supply of resident Tamil labor developed in Ceylon as estate employes settled in the island and raised families there. Probably resident Tamils now supply nearly half the employes on Ceylon rubber estates.

In Malaya, Tamils (with some Telugus, Malayalis, and other Indians) were supplemented mainly by Chinese labor. In the early days Javanese indentured labor was also employed to a considerable extent, possibly 8% of the total at the peak, but only 2% now. Local Malay races were never used for estate labor to an important degree for extensive periods, but are resorted to in times of emergency, on a temporary basis.

In Netherland India the backbone of the estate labor supply has always been the Javanese, who were employed on an indentured labor basis in the outer possessions until very recent years. In Java the estates depend upon labor from nearby villages almost altogether, labor being free to engage where it pleases; but in Sumatra, there being originally practically no local supply of labor, the Javanese were brought in on a three-year contract basis. An appreciable number of Chinese and a few Tamils have also been used on estates in Sumatra.

The production of rubber spread gradually to the native populations in each rubber producing district, and on their small holdings the natives of each country, respectively, are engaged. Javanese labor, in the later years of the Stevenson Restriction Scheme, was temporarily an important factor in production of rubber in native dis-

tricts in the outer possessions of Netherland India, and Chinese labor has often found employment even in recent years on native holdings in British Malaya.

This brief summary indicates broadly the nationalities of the million or more laborers now engaged on rubber estates and small holdings in the producing countries. Tamil labor in Ceylon and Malaya, Javanese in Netherland India, constitutes the fundamental labor supply of rubber estates not only in these countries, but in most of the other regions although countries having a small rubber production often depend to a large extent on local labor. Only in Malaya, and to a less extent in Sumatra, has there been anything that might be termed competition between the polyglot nationalities employed; in Malaya there is evidence that the effectiveness of different types of labor is being measured to an extent that is reflected in a noticeable trend in labor statistics. The available data on rubber estate employes in Malaya are therefore of particular interest.

Rubber Estate Employment in Federated Malay States

The most representative data available on rubber estate employment relate to the Federated Malay States. Table 1 presents summary statistics covering employment on rubber estates in that area (comprising the important rubber producing states of Perak, Selangor, and Negri Sembilan, and the less developed state of Pahang). Total employment, and the percentage distribution by principal nationalities, are shown for rubber estates, covering only estates with over 100 employes beginning 1929. Data are not available to the author for the years 1923 and 1924.

TABLE 1. RUBBER ESTATE EMPLOYMENT IN FEDERATED MALAY STATES
From 1929—On Estates with over 100 Laborers

	Year-End Number	Percentage		
		Indians	Chinese	Other
1915.....	170,741	74.0	16.1	9.9
1916.....	196,123	70.5	21.8	7.7
1917.....	220,758	67.5	25.1	7.4
1918.....	201,964	69.1	23.0	7.9
1919.....	237,134	67.8	25.8	6.4
1920.....	216,588	74.4	18.9	6.7
1921.....	156,341	77.9	16.5	5.6
1922.....	167,259	77.9	16.6	5.5
1925.....	166,179	82.0	13.9	4.1
1926.....	210,995	81.4	15.0	2.6
1927.....	196,121	85.8	10.8	3.4
1928.....	192,763	82.4	13.9	3.7
1929.....	218,256	80.0	16.4	3.6
1930.....	169,681	78.2	18.2	3.6
1931.....	142,504	73.5	23.1	3.4
1932.....	125,600	71.6	25.0	3.4
1933.....	136,861	70.3	25.7	4.0

Sources: 1915-1922, "Rubber Plantation Industry in the Middle East," by D. M. Figart; 1925-1933, "Annual Reports of the Labor Depart.," F.M.S.

This table shows peak employment occurred in 1919, the post-war boom year; while the low point for the entire period since 1915 occurred in 1932. For the eight-year period ended 1922, average employment was 195,864; for the nine-year period ended 1933 the average was only 173,217. The total net exports of rubber from the Federated Malay States averaged 66,437 tons annu-

ally in 1915-1918 and 107,688 in 1919-1922; the production of rubber on estates over 100 acres alone averaged 140,940 tons in 1929-1933—the increasing production of rubber “per laborer” is evident from these figures.

During the period 1915-1918 planting was going on at a good rate, and methods of production were but loosely organized. Prices of rubber were high, and estate efficiency was low; the same was true as regards prices of tires and efficiency of tire factories. During the period 1930-1933 plant extensions were virtually at a standstill, and every possible means of economizing in labor and increasing efficiency was resorted to, on rubber estates the same as in tire factories. The question for estates was merely how to produce at the lowest cost per pound; the first time they had actually faced the question squarely.

Increased Rubber Production per Employee

How effectively the estates have in recent years succeeded in increasing “average output per employee” is revealed but partially in Table 2, where the average employment on estates with over 100 laborers is compared with the production of estates over 100 acres in size, and the result stated in pounds of rubber per employee. Similar production data are not available for preceding years, but the years 1928 and 1929 had witnessed a like increase as compared with 1927, prior to which it is doubtful if “yield of rubber per employee” had ever averaged 1,000 pounds in any year for any large rubber producing region, except possibly in Dutch native areas in 1925. The fact that planting has virtually ceased is, of course, an important factor in this situation.

TABLE 2. RUBBER PRODUCTION PER ESTATE EMPLOYEE, F.M.S.

Year	Average Employees	Rubber Tonnage	Pounds per Employee
1929	205,500	144,578	1,576
1930	194,000	140,779	1,625
1931	156,000	141,457	2,030
1932	134,000	140,525	2,349
1933	131,200	137,363	2,342

Yield per employee is now above a ton of rubber annually in this area, and no doubt this is more or less typical of conditions elsewhere, although probably estate efficiency in the F.M.S. is well above average.

Trend toward Chinese Tappers

Referring again to Table 1, it will be noted that from 1917 to 1927 the tendency was for the percentage of Indians employed to increase more or less steadily; while the percentages of Chinese and Javanese and other employees both declined. Since 1927, however, the percentage of Indians has declined with each successive year; the percentage of Chinese has increased, and the percentage of other employees has not varied to a significant extent.

During the war period the Chinese labor supply was used more or less as an emergency measure. Then, too, in those years Chinese labor was used more on heavy work in clearing jungle and preparing for planting than in actual production operation. In the period of heavy planting following 1925 the planting operations were, oftener than not, in the nature of extensions of existing plantations and were often carried on by the permanent estate employees. The recent increase in percentage of Chinese is attributable to their employment in production and particularly in tapping. Considering this fact, the change seems not unlikely to become permanent.

Chinese Compared with Tamils

The above generalities do not explain why this change has occurred, and, of course, they represent a broad pic-

ture without allowance for the influence of widely varying specific conditions on individual estates. According to R. H. Wright in the London *Financial Times*, Chinese labor is imperatively used on so-called unhealthy estates, as Chinese will thrive where Tamils would sicken, causing hospital and medical charges to mount up alarmingly and in combination with vacant tapping tasks to result in reduction of crops and increased cost of production. Likewise, when an estate is extremely hilly, Tamils will do only small tasks, and on account of the extra tappers required, tapping with Tamils is uneconomical. On estates remote from towns the Chinese are more satisfied than are Tamils, who do not like being immured in the jungle.

The situations outlined above are typical examples of what might be termed “Chinese preserves.” On the other hand in the case of healthy estates on fairly level land in a settled district the docility and tractableness of the Tamil (the history of rubber estate relations with labor is almost singularly harmonious and free of cases of any serious labor troubles) make him a very satisfactory type of employee, more especially because the rate of daily pay is lower than for Chinese. In the past this lower daily rate of pay was more emphasized than now, when estate managers are considering total tapping costs per pound of rubber as more important.

Estates with an old-established labor force and recruiting connections in India naturally are slow to change. The daily pay rate is low, but there are many overhead expenses, as the estate using Tamil labor must provide hospital and medical attention and often educational facilities for children, pay recruiting expenses and transport, make allowance for feasts and presents, and pay coolie assessment charges, besides considering vacant tasks due to sickness and leave of absence. Then, too, “crimping” or enticement of employee to a new employer by the offer of higher wages is still by no means uncommon in good times, even for Indians.

Estates using Chinese tappers operate on an entirely different system. Here the estate manager ordinarily arranges with a Chinese contractor to handle tapping subject to a specific agreement. The contractor in turn hires the tappers on a kind of piece-work basis. The overhead expenses of the estate in such a case are greatly reduced. Of course estates often employ Chinese tappers individually. The chief criticism of the Chinese is that his rate of pay is high and changes quickly upward when business is profitable. The Chinese contractor, and the coolie, too, believes he should share in any rubber prosperity. The Chinese is naturally a more skilful artisan than the Tamil. Working for pay based on production, he naturally tries to get the utmost production per tapping, but such practices as too-deep tapping can be covered in the agreement with the contractor, and if subject to a substantial fine, the latter will control his coolies on this score. A Chinese tapping force requires less supervision from estate officers than Tamils, among whom it is difficult to maintain any high working pitch, and man for man Chinese will tap one-third more trees, at least on hilly ground. It is probable that the trend shown in the above statistics is due to a gradual recognition that considering total costs of production, employment of Chinese is economical. That this occurred during the course of the depression shows that when prices were at their lowest, the Chinese were then willing to work for wages equivalent to existence pay only. In some extreme cases entire estates were turned over to Chinese contractors to operate subject to an agreement to deliver rubber in fully prepared form for a price as low as 3¢ Straits a pound, it was reported.

Effect of Change on F.M.S. Population

The 1921 census showed a South Indian population of 305,000 in the Federated Malay States. At the end of 1929 this number is officially estimated to have increased to 420,000. The 1931 census showed 380,000; at the end of 1933 the estimate was 310,750. Since 1930 Malayan assisted passages of Indian laborers have practically ceased, and departures of Indians from Malaya as deck passengers have exceeded assisted emigrants every year since 1927, this excess amounting to approximately 115,000 in 1930; 101,000 in 1931; 84,000 in 1932; and 33,000 in 1933—these figures are for British Malaya as a whole. The South Indian population of the F.M.S. in 1931 included 317,883 Tamils, 22,142 Telugus, 16,843 Malayalis, and 23,128 of other races; at the end of 1933 the number of Tamils was probably about 260,000.

Decline in Hospitals and Schools

It would certainly be improper to say that the closing down of many estate hospitals and schools was rendered possible by the trend away from Indian labor. The depression, of course, really forced this development, but the trend toward Chinese labor has doubtless been a contributory factor. The number of hospitals reported for 1926 was 156; this had increased to 172 in 1929; in 1933 the number was reduced to only 129. Many of these have always been group hospitals caring for several estates; the number of group hospitals was reported as 73 in 1932 and only 47 in 1933. The decline in hospitals has not resulted in an increasing death rate in Indian laborers; the rate per thousand was 6.89 in 1933, 6.18 in 1932, 9.74 in 1931, 12.51 in 1930, and 12.58 in 1929.

The number of schools to provide elementary education to children of estate employes was reported at 386 in 1926; this increased to 513 in 1929 and declined to only 246 in 1932 and 1933. No organized pressure has been exerted to maintain standards in these schools in recent years, for conditions make it impossible.

Rates of Pay for Indian Labor in F.M.S.

The annual reports of the Labor Department for the Federated Malay States show the following rates of pay for Indian labor annually since 1928. At the end of July, 1930, minimum rates were reduced 20%. The fact that Chinese have been increasingly employed indicates that they must be more economical than Indian labor in times of depression; whereas in earlier rubber history they were used only in times of boom and emergency. Data on daily pay of Chinese are not available. Whether they will remain more economical under present improved conditions is a question for the future to answer.

The reports of the Labor Department also mention the estate toddy shops. The Tamil likes his village and his "kadde" (shop) where he can meet his friends and drink his toddy evenings. During the later depression years complaints of drunkenness of estate laborers from drinking samshu were brought to notice of the Labor Department, and it was found that Chinese were selling this cheap illicitly distilled liquor as a means of livelihood. That the government doubtless derives considerable revenue from the estate toddy shops appears in the following quoted paragraphs from the 1933 report:

"The majority of toddy shops on estates are held on the two-fifths system, that is to say, two-fifths of the gross takings are paid into Government revenue and the balance, after deducting the expenses of running the shop, into a fund which is expended for the benefit of the laborers."

Some readers may ask why the local Malayan popula-

TABLE 3. RATES OF PAY TO SOUTH INDIANS ON RUBBER ESTATES—
FEDERATED MALAY STATES

	Perak					
	1928 Cts.	1929 Cts.	1930 Cts.	1931 Cts.	1932 Cts.	1933 Cts.
Stores and Factories....	50-80	50-80	45-50	35-50	35-50	
Men						35-40
Women						30
Tappers						
Men	45-55	50-85	40-45	30-40	26-40	32
Women	35-50	40-75	32-40	27-40	24-32	27
Field						
Men	40-50	50-65	40	30-35	25-30	32
Women	30-45	40-50	32-40	25-30	22-25	26
Selangor						
Stores and Factories....	50-60	50-75	40-50	35-50	35-50	
Men						37-50
Women						32-45
Tappers						
Men	45-52	50-80	40-45	30-40	26-40	28-32
Women	40-50	40-60	32-35	27-40	24-32	24-30
Field						
Men	40-45	50-55	40-45	30-35	25-40	28-30
Women	30-40	40-45	32-35	25-30	22-32	24-25
Negri Sembilan						
Stores and Factories....	60-65	55-80	40-48	35-50	32-50	
Men						40-55
Women .....						.. ..
Tappers						
Men	45-50	55-70	40	35-45	27-40	30-35
Women	45-50	45-50	32	27-40	24-32	25-30
Field						
Men	40-50	50-55	40	30-35	25-30	28-35
Women	30-40	40-45	32	27-32	22-25	25-30
Pahang						
Stores and Factories....	60-65	60-65	50-60	45-55	35-55	
Men						47-60
Women						37
Tappers						
Men	50-65	50-70	47-55	35-50	30-47	40
Women	50-65	50-65	37-50	30-47	26-37	30
Field						
Men	50-65	50-65	47-55	35-47	28-47	37
Women	40-50	40-50	37-50	30-37	24-37	30
U. S. Value of Straits Dollar	56.28	56.01	55.96	52.45	40.40	49.23

Source, "Annual Reports of the Labor Dept.," F.M.S.

tion is not employed to a large extent on rubber plantations. In reply, we cannot do better than quote the following paragraph which occurs practically unchanged in each annual report of the F.M.S. Labor Department from 1926 to 1933. We quote the 1933 report:

Local Malay Labor

"This labor is of very little importance. Its part in the economic life of organized plantations is best gauged from the figures given elsewhere. No large estates depend to any great extent on Malaya and the total number engaged at any one time on estates in the F.M.S. is, at the most, 3,000 persons. The reason why more Malays are not employed as laborers is that they are unwilling to work regularly. They merely use estates as an occasional convenience, and even that to a very small extent, to supplement whatever livelihood can be made out of their kampongs and cannot be relied on to remain on the estates when their services are most urgently required. They are, as a rule, not desirous of earning any more money than is sufficient to support them and to provide them with the needs of the moment. As is the case with the locally engaged Javanese small numbers of Malays supplement regular labor forces of Indians or Chinese on many estates but the Malays work even less regularly than locally engaged Javanese."

Labor in Sumatra East Coast

While specific information regarding rubber estate employment is not available for Sumatra, the following data
(Continued on page 44)

Annals of Rubber¹

Chronological Record of the Important Events in the History of Rubber

1921. The Fifth International Rubber Exhibition was held in London.

1922. The "Stevenson Plan," originated in England for restricting and regulating the allowable exportations of crude rubber in British controlled territory in the Far East, became effective November 1, 1922, and was discontinued November 1, 1928.

The Rubber Research Scheme (Ceylon) was established and supported jointly by the Government and the rubber producers in Ceylon.

1923. Rubber latex importations from the Far East began on a commercial scale, inspired by the inventive enthusiasm of the late Ernest Hopkinson, of the United States Rubber Co.

William Beach Pratt invented the process for water dispersion of rubber. Italian patent No. 225,949 was followed by patents in the United States and many other countries.

Sheppard and Ebertin obtained U. S. patent No. 1,476,374 on electro-deposition of rubber upon which and others the Anode process for manufacturing rubber goods is based.

Revue Générale du Caoutchouc was established in Paris, France, as the organ of the caoutchouc and related industries.

P. Schidrowitz was granted United States patent No. 1,443,149 and British patent No. 193,451 for vulcanizing latex, commonly known as the "Vultex" process.

The Rubber Growers' Association published a "Handbook on Rubber Uses and Their Development."

1924. The Sixth International Rubber Exhibition was held in Brussels, Belgium.

Balloon tires were introduced, using from 32 to 40 pounds' inflation pressure as against 80 to 90 pounds previously used.

Winkelmann and Gray received the first United States patent for non-accelerating age resisters.

Deutsche Kautschuk Gesellschaft was established. This society in agreement with Reichsverband der Deutschen Kautschuk Industrie solves jointly with it questions of standardization for the entire German rubber industry. *Kautschuk* is the official publication of the society.

Goodyear Rubber Plantations Co., Akron, O., was incorporated September 13 to operate rubber plantations in Sumatra.

The Firestone Tire & Rubber Co., Akron, O., received from Liberia, Africa, a concession for a rubber plantation.

I.R.I. Transactions, a bi-monthly publication, official organ of the Institution of the Rubber Industry, was founded.

H. L. Trumbull and J. B. Dickson were patentees of a method of dispersion for crude and reclaimed rubber, under United States patent No. 1,513,139.

Chicago Group, Rubber Division, American Chemical Society, was organized.

1925. Rubber Research Institute of Malaya, estab-

lished by government enactment, was financed by a cess on rubber exports.

Bierer-Davis oxygen bomb for accelerated aging of vulcanized rubber was introduced.

In 1925 only about 10% of the rubber used in manufacture was from wild sources; the remaining 90% was plantation cultivated rubber. Manufacturers in Akron, O., and vicinity used about 45% of the total tonnage produced.

Rubber Exchange of New York, Inc., was established through the instrumentality of Frank R. Henderson, its first president. Its declared purpose was to broaden the market and stabilize rubber prices.

Watch-case vulcanizers were introduced for curing tires.

1926. The Ford company was granted by Brazil a concession of 3,700,000 acres and almost complete exemption of taxes and duties for fifty years. The land is located 150 miles south of the city of Santarem, on the Tapajos River, between Cupary and Tapacura, where rubber plantations are to be developed on quite a large scale.

1927. *Rubber Chemistry and Technology*, issued quarterly under the auspices of the Rubber Division, A.C.S., publishes activities of the Rubber Division and papers of original research on rubber.

Harry L. Fisher was granted United States patent No. 1,642,018 for plastic products from rubber.

Reliable estimates made at the end of the year indicated that the total area under cultivation was 6,500,000 acres, or 10,156 square miles. The amount of plantation rubber produced during the year was in excess of 567,000 long tons. Less than 38,000 tons came from trees in the wild state in South America and other countries.

1928. H. A. Bruson was granted British patent No. 285,071 on rubber polymers and oxides. This patent relates to the thermoplastic molding material, Plioform, and to Plioform paints. In 1932 he was granted United States patent No. 1,846,247 for the same invention.

Federal Judge Arthur J. Tuttle in a decision rendered in the U. S. District Court, Detroit, Mich., June 14, refused to sustain the Alden L. Putnam patent, U. S. No. 1,537,879, for balloon tires held by the Steel Wheel Corp., Lansing, Mich.

Average plantation production per acre was 436 pounds of rubber. Countries listed in their order of consumption follow: United States, Great Britain, Germany, France, Canada, Japan, and Italy.

The following local groups, Rubber Division, A.C.S., were begun: New York, Boston, Akron, and Los Angeles.

Rubber Institute, Inc., under Director-General Lincoln C. Andrews, was organized June 1, with a directorate of leading rubber manufacturers generally to promote service of the industry to public welfare. It merged with The Rubber Association of America, Inc., May 10, 1929.

Sir Henry A. Wickham died in London, September 27, at the age of eighty-two.

(To be continued)

¹ Continued from INDIA RUBBER WORLD, Dec. 1, 1935, pp. 30, 43.

Compounding Ingredients¹

Compositions—Properties—Functions

DEPENDABLE chemical pigment colors for rubber compositions are relatively new and popular because of the unlimited range of color effects possible by their combinations.² The long, high temperature curing practice prevailing previous to about 1913 precluded the use of chemical pigment colors in rubber. The color situation is now completely altered by the curing conditions brought about by the use of accelerators as well as the remarkable progress that has been made in the manufacture of dyes in the United States. Vulcanization of every line of rubber goods is now possible at temperatures in which organic colors remain unchanged. In consequence a very extensive selection of such colors has been perfected and introduced for rubber work. Color schemes never before available are now used in weatherproofed clothing, footwear, bathing accessories, novelties, etc., and artistic color effects are now combined with stylish design, fit, and utility, to make a stronger sales appeal.

Chemical Pigment Colors

Unlike mineral colors, chemical pigment colors are rarely other than neutral toward the ingredients of a rubber mixing. This fact and the small amount of pigment necessary to produce the desired color tone enables the compounder to arrange his formula for definite time and temperature curing with little consideration of the color item other than its tinctorial value.

The fundamental color factors are hue, brightness, and saturation.

Hue is the predominant wave length emitted by the coloring material under consideration, and it determines the position of the color in the spectrum.

Brightness is the percentage of the incident light which is reflected. A very brilliant white body approaches 100% in brightness; while jet black approaches 0%, although it should be noted that all blacks reflect some light and all whites absorb a little.

Saturation is the percentage of reflected light which is colored. A certain percentage of the reflected light is deprived of most of its wave lengths excepting those in a narrow range which produce the sensation of color. The percentage is called the saturation. The portion of the spectrum reflected determines the hue. The remainder of the light striking the body is reflected as white light being without change in the proportion of the different wave lengths present.

Among the many chemical pigment colors available from every color maker and dealer may be mentioned brown, tan, green, blue, yellow, orange, red, pinks, flesh, and orchid tones each in variations without limit.

Types of Chemical Pigment Colors

Every chemical pigment is a distinctive product. For that reason color manufacturers are reticent with regard to chemical compositions although the types are freely indicated as lakes, toners, vat dyes, etc. Each manufac-

turer employs a system of notation to indicate the color items of his own specialties, vulcanized samples of which are displayed on color cards for purposes of selection.

Commercial Forms

Colors for rubber work are of various types such as lakes, toners, insoluble pigment colors, indigo derivatives, oil soluble dyes, etc. These are supplied in the form of dry powders, oily pastes, or dispersed in rubber as batched colors. The dry powder form is not so convenient for mixing in rubber because of its propensity to fly about the mixing department and deposit color far and wide. The paste form mixes readily with rubber and is much cleaner to handle. The preferred form, however, is the dispersed or rubber and color master-batched form. This method permits more exact weighing of the color item as an ingredient in the rubber mixing and is absolutely clean on the mill and about the premises. The color variety available in batched or dispersed form includes red, orange, yellow, green, blue, and purple of various tones for use singly or in combinations and suitable to all types of cures.

Fastness Tests

In selecting a chemical pigment color for a special purpose and cure reference should be made to the maker's chart specifying the adaptability to method of cure, fastness to light, boiling water, soap solution, migration, crocking, the soap dish test, effect of stearic acid, lime, and different types of accelerators, also its aging influence on the rubber.

Important manufacturers and distributors of chemical pigment colors for rubber work follow: Ansbacher-Siegle Corp., Brooklyn Color Works, Inc., E. I. du Pont de Nemours & Co., Inc., General Dyestuff Corp., and Rubber Service Laboratories Co.

Addenda

Fillers

Barytes, Micronized

CHEMICAL COMPOSITION. Barium sulphate.
SELLER. Whittaker, Clark & Daniels, Inc.
PHYSICAL STATE. Fineness from 400 to 1,000 mesh; otherwise same as Barytes.³

Clay, Micronized

CHEMICAL COMPOSITION. Aluminum silicate.
SELLER. Whittaker, Clark & Daniels, Inc.
PHYSICAL STATE. Fineness from 400 to 800 mesh; otherwise same as Clay or Kaolin.⁴

Magnesia, Micronized

CHEMICAL COMPOSITION. Magnesium oxide.
SELLER. Whittaker, Clark & Daniels, Inc.

¹ Concluded from INDIA RUBBER WORLD, Nov. 1, 1935, pp. 37-39.

² "Organic Colors for Rubber Goods." Webster Norris, *Ibid.*, June 1, 1928, pp. 57-59.

³ INDIA RUBBER WORLD, Oct. 1, 1935, p. 33.

⁴ *Ibid.*, Sept. 1, 1935, p. 44.

PHYSICAL STATE. Fineness from 400 to 1,000 mesh; otherwise same as Calcined Magnesia.⁵

Mica, Micronized

CHEMICAL COMPOSITION. Potassium aluminum silicate.

SELLER. Whittaker, Clark & Daniels, Inc.

PHYSICAL STATE. Fineness from 400 to 1,000 mesh; otherwise same as Mica.⁵

Whiting, Micronized

CHEMICAL COMPOSITION. Calcium carbonate.

SELLER. Whittaker, Clark & Daniels, Inc.

PHYSICAL STATE. Fineness from 400 to 600 mesh; otherwise same as Whiting.⁵

Mineral Accelerators

Blue Lead, Sublimed

CHEMICAL COMPOSITION. Composite of basic lead sulphate, other lead compounds, carbon, etc.

SELLER. Eagle-Picher Sales Co.

APPLICATIONS. Mechanicals.

PHYSICAL STATE. Bluish-gray powder. Particle size, average median (diameter), 0.25-micron. Maximum residue, 325 mesh, 1%.

PROPERTIES. Sp. gr., about 6.85. Odorless. Stable. Toxic.

PURPOSE AND FUNCTION. Mild accelerator of vulcanization and fine-grained filler.

METHODS OF USE. Add directly to the rubber.

VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).

PATENTS. Not disclosed.

Litharge, Milled

CHEMICAL COMPOSITION. Lead monoxide.

SELLER. Eagle-Picher Sales Co.

APPLICATIONS. Mechanicals, footwear, molded articles, etc.

PHYSICAL STATE. Reddish-brown powder. Particle size, average median (diameter), 8.1 microns. Maximum residue on 325 mesh, 1%.

PROPERTIES. Sp. gr., 9.3. Stable. Odorless. Toxic. Soluble in acids.

PURPOSE AND FUNCTION. Accelerator of vulcanization and activator of certain organic accelerators.

RELEVANT MATERIALS. Activates most thiazole-type accelerators, e.g., Captax, Acrin, Ureka C, and some aldehyde-amines, e.g., Accelerator 833, giving fast cures and high physical properties. Not retarded by carbon black.

METHODS OF USE. Add directly to the rubber. Cool slabs thoroughly before storing.

VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).

PATENTS. Not disclosed.

Litharge, Sublimed

CHEMICAL COMPOSITION. Lead monoxide.

SELLER. Eagle-Picher Sales Co.

APPLICATIONS. Cements, mechanicals, footwear, molded articles, etc.

PHYSICAL STATE. Yellow powder. Particle size, average median (diameter), 1.6 microns. Maximum residue on 325 mesh, 1%.

PROPERTIES. Sp. gr., 9.3. Odorless. Toxic. Soluble in acids.

PURPOSE AND FUNCTION. Accelerator of vulcanization and activator of certain organic accelerators.

RELEVANT MATERIALS. Activates most thiazole-type accelerators, e.g., Captax, Acrin, Ureka C, and some aldehyde-amines, e.g., Accelerator 833, giving fast cures and high physical properties. Not retarded by carbon black. Stearic acid and pine tar minimize scorching tendency.

METHODS OF USE. Add directly to the rubber. Take precautions to avoid scorching and cool slabs thoroughly before storing.

VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).

PATENTS. Not disclosed.

White Lead, Basic Carbonate

CHEMICAL COMPOSITION. Basic lead carbonate.

SELLER. Eagle-Picher Sales Co.

APPLICATIONS. Mechanicals, tire treads, molded goods, etc.

PHYSICAL STATE. White powder. Particle size, average median (diameter), 2.2 microns. Maximum residue, 325 mesh, 0.15%.

⁵ *Ibid.*, Oct. 1, 1935, p. 35.

⁶ *Ibid.*, p. 36.

PROPERTIES. Sp. gr., 6.99. Odorless. Stable. Toxic. Soluble in acids.

PURPOSE AND FUNCTION. Activator of certain organic accelerators. Mild accelerator when used alone.

RELEVANT MATERIALS. Activates most thiazole-type accelerators, e.g., Captax, Acrin, Ureka C. As an activator, substantially as powerful as litharge, but less active and more workable than litharge at processing temperatures. Not retarded by carbon black.

METHODS OF USE. Add directly to the rubber.

VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).

PATENTS. U. S. Nos. 1,926,739 and 1,926,740.

White Lead, Sublimed

CHEMICAL COMPOSITION. Basic lead sulphate.

SELLER. Eagle-Picher Sales Co.

APPLICATIONS. Mechanicals, footwear, molded articles.

PHYSICAL STATE. White powder. Particle size, average median (diameter), 1.8 microns.

PROPERTIES. Sp. gr., 6.74. Odorless. Stable. Toxic.

PURPOSE AND FUNCTION. Mild accelerator of vulcanization.

METHODS OF USE. Add directly to the rubber.

VULCANIZATION. Minimum 25 pounds' steam pressure, 130° C. (267° F.).

PATENTS. Not disclosed.

Mold Lubricants

Mold Paste RSL

CHEMICAL COMPOSITION. Several ingredients blended for mold lubrication.

SELLER. Rubber Service Laboratories Co.

APPLICATIONS. Rubber molding work.

PHYSICAL STATE. Light brown wet paste.

PROPERTIES. Sp. gr., 1.54. Soluble in equal volume of water practically completely. Stable. Non-toxic.

PURPOSE AND FUNCTION. Lubricates molds for easy removal of articles.

METHODS OF USE. Dissolve ten pounds of paste (approximately one gallon) in 30 to 50 gallons of water. This solution is used by brush or spray application.

VULCANIZATION. No effect on cure.

PATENTS. Not disclosed.

Sericite

CHEMICAL COMPOSITION. A somewhat fibrous micaceous natural mineral of irregular crystalline structure.

SELLER. Whittaker, Clark & Daniels, Inc.

APPLICATIONS. Rubber molding work.

PHYSICAL STATE. Fine white powder.

PROPERTIES. Sp. gr., 2.95. Stable. Insoluble. Non-toxic.

PURPOSE AND FUNCTION. Lubricates molds for easily removable articles.

METHODS OF USE. Dust on articles before placing them in molds.

VULCANIZATION. No effect on cure.

PATENTS. U. S. No. 1,591,767 owned by Fisk Rubber Co.

Softeners

R.P.A. No. 1

CHEMICAL COMPOSITION. Zinc chloride double salt of phenyl hydrazine.

SELLER. E. I. du Pont de Nemours & Co., Inc.

APPLICATIONS. General rubber compounding, frictions, cements, etc.

PHYSICAL STATE. Powder.

PROPERTIES. Stable. Non-toxic.

PURPOSE AND FUNCTION. Softening crude rubber. By its use the plasticity of rubber may be controlled to degrees of softness ranging from normal masticated rubber to rubber that will flow at room temperature without prolonged milling and without adding softeners or diluents.

METHODS OF USE. Add directly to the rubber on open mill or Banbury mixer from 0.5 to 1%, according to the nature of the stock. Sulphur, carbon black, and clay interfere with the peptizing action of R.P.A. No. 1 and, consequently, should not be added to the rubber until after the full softening action has taken place.

VULCANIZATION. Effect on the rate of cure and on the properties of vulcanized rubber depends upon type of accelerator. This softener is slightly retarding and can be corrected by increasing the amount of the accelerator.

PATENTS. Not disclosed.

The End

Rubber Production¹

Edgar Rhodes²

SACKETT'S paper³ seems to have crystallized the whole situation. However, it is one thing for Sackett to say what is wanted and quite another to get it accomplished at once in Malaya.

First, the position of the Rubber Research Institute in the "hodgepodge" of organizations which make up the industry and its powers should be clarified. The institute is not a government institution in the accepted sense of the word, or is it a business organization. This means that it has no power to force the planting community to adopt any particular method of manufacture and no power to change the methods of marketing now in vogue. The influence of the institute does not extend beyond the spheres of advice and suggestion.

On the one hand, the institute has the planting community which aims solely at satisfying a broker's standard; on the other hand are the rubber chemists who want a rubber with qualities not taken into account by the broker and who perhaps sometimes feel that the broker has not always, even by his own standards, given rubber of the grade paid for. The institute is in a difficult position, but is doing all it can to persuade the planting community to produce an article which will conform to brokers' standards and at the same time possess in greater and greater degree, as time goes on, the other qualities which the chemists require. This has been the institute's policy, and by persuasion something is being achieved which should eventually be of value to all. Sackett wants:

1. Uniform rubber in three directions:
 - a. Rate of cure.
 - b. Plasticity where the plasticity corresponds to a fairly soft rubber.
 - c. Aging properties.
2. Rubber with lower water absorption.
3. Clean rubber.
4. Rubber free from dangerous and deleterious materials.
5. Light colored sheet.
6. Better packing.

He points out that, in self-defense against the prevalence of some of these defects, users have developed means of overcoming them; he indicates almost after the manner of the canny Scotch planter himself that, while the user wants a general improvement in all these qualities and would welcome a better article, he would probably not want to pay a premium to obtain it in view of the various means which he has developed for utilizing poor rubber. The institute, then, should do all in its power to give the user a rubber which will require neither this extra processing nor a higher price.

Uniform Rate of Cure

In order to outline the prospects of achieving uniform rate of cure let us examine the difficulties and see what has been done recently toward achieving it. The variation in sheet rubber is due briefly to (1) source of latex, (2) methods of tapping, (3) changes between tree and factory, and (4) lack of finesse in factory procedure.

Source of Latex

Latex is not and can never be a synthetic laboratory chemical of constant composition. It is a biological fluid and not a special chemical. It comes from a tree which is dependent for its very existence on sun, rain, and soil. Because the tree is a tree, it is subject to natural physiological cycles of wintering, refoiliating, flowering, and seeding. Rubber trees differ slightly in genetic strain. They grow differently on different soils, and it is ridiculous for us to expect to obtain latex of constant chemical composition all the year round. The factors which affect variation in latex are (1) season of the year, (2) age of the trees, (3) geographical situation, (4) state of the soil, and (5) genetic strain; these variations are of the sort which cannot be prevented by any known means. Variation due to these causes is inherent in the trees and their locality. Variations occur not only in the rubber content of the latex, but also in the content of non-rubber constituents and nitrogenous and mineral materials. The chief variations occur with the seasons. For instance, in Malaya, in February and March when trees are wintering, the dry rubber content is high; in April and May when trees are refoiliating the dry rubber content is at a minimum; when refoiliation is completed, the dry rubber content gradually rises until it reaches a maximum in July and August; in the wet months of September and December the dry rubber content falls again. Also the ash of the latex is low during the wintering period and again when the seeds are falling, which occurs in July and August.

These inherent variations result in variable rates of cure and are the fundamental obstacles standing in the way of achieving uniformity.

Methods of Tapping

The method of tapping superimposes another variable. The fact of repeatedly opening a tree and causing it to emit latex imposes a strain, and the greater that strain, the greater is the variation in the composition of the latex. The greater the frequency of tapping or the longer the cut, the greater is the variation in composition. In Malaya and the Netherlands Indies the tapping systems most commonly used differ in severity and tend toward different degrees of variation.

The daily alternate-monthly system of the Netherlands Indies involves tapping the trees each day for a month and then resting them for a month. This results in a constant change in latex composition over the whole tapping period. There may be a steady fall in dry rubber content from 44 to about 27% during the month, and the crop of each day is different.

The alternate-daily continuous and the ABC systems of Malaya involve continuous tapping every alternate day for a year or more. The result is that after the first few days the latex reaches a sort of equilibrium in composi-

¹ Paper presented before the Division of Rubber Chemistry at the eighty-ninth meeting of the A. C. S., New York, N. Y., Apr. 22-26, 1935. Reprinted from *Ind. Eng. Chem.*, Oct. 1, 1935, pp. 1204-209.

² Rubber Research Institute of Malaya, Kuala Lumpur, Federated Malay States.

³ INDIA RUBBER WORLD, Dec. 1, 1935, pp. 31-34.

tion, apart from seasonal and other inherent variations. The variation in composition is smaller than in the Sumatran system, and this should, in theory, make for greater uniformity in the rubber. If all estates in all producing countries found it economic to tap on some such continuous system, this might smooth out some variation. Problems concerning estate management and tapping costs will undoubtedly prevent the adoption of a uniform system, and we must therefore conclude that the raw material (latex) will always be variable. The variation will be partly inherent and partly due to tapping methods.

Changes between Tree and Factory

Whenever latex is won from a tree under practical conditions, it is contaminated with bacteria. This contamination cannot be prevented in practice. Cultures on dextrose agar show at 10 a.m., six million bacteria; at 11:30 a.m., sixty million; and at 1:30 p.m., two hundred million.

The acidity which the bacteria produce causes premature coagulation in the field, which can be prevented by the addition of small quantities of either sodium sulphite or ammonia. But the amounts in which they are used are not sufficient to kill the bacteria. They do not sterilize the latex, and, although the latex may appear to be satisfactory, the bacteria are still at work producing decomposition in the latex constituents. Varying degrees of bacterial contamination and activity from day to day can, therefore, make only for a further adventitious variability in latex composition. For this variation the obvious remedy is speed of collection, but the speed maximum is variable according to the lay of the land, state of the roads, and distance from the factory. In practice we cannot avoid harvesting an inherently variable material and one charged with bacteria which must contribute a further adventitious variable. This means that, if we are to produce uniform rubber, the factory must do something to smooth out these variations without introducing any new ones.

Developments in Factory Procedure

OLD-TIME FACTORIES. Ten years ago transport of latex was, on the majority of estates, by man power. All collectors carried their latex to the factory. Those on outlying sections came in late. The larger estates often had a number of small factories because there was too much loss of rubber through clotting if all coolies had to walk to one place. The factory usually contained wooden or tiled tanks for coagulation. These were 9 to 11 inches deep. The machinery for sheet manufacture consisted usually of two pairs of light, smooth-steel, even-speed rolls and a similar pair of grooved rolls for marking the sheet and imprinting the estate name. The machines were side by side and usually remote from the coagulating tanks. The latex was sieved through coarse sieves straight into the coagulating tanks, diluted with water, and treated with acid. Now, it rains in the tropics, and when cuts were low, sand and dirt were splashed into the cups. Sand particles are frequently as small as 1/200-inch, and the sieves used were about 40 mesh. Sand does not settle out of raw latex easily. A viscosity of 14 to 20 centipoises prevents its settling. When latex is diluted with an equal volume of water, the sand settles easily. Thus, the sand went into the coagulating tanks. Dilution and coagulation brought it through into the rubber, because the subsequent simple rolling out into a sheet only embeds the dirt more firmly. The dilution of the latex left a good deal to be desired in many cases because quite often no hydrometer or metrolac was used to assist in arriving at a fixed standard of dilution. The

amount of acid added for coagulation was usually more than was necessary, because, with machines and tanks remote from each other, it was necessary to carry each piece of the wet junket or coagulum by hand from tank to machine. This meant that the coagulum had to be made tough enough to be carried; in other words, it meant excess acid. Even then the tough coagulum was deformed by being carried about. It was mutilated still more either by being walked on to press it thin enough to enter the first machine, or else by being crudely rolled by hand with a wooden roller on a flat table. By the time the pieces were ready to enter the machines, they were by no means uniform in thickness, and the irregularities persisted through the machining process. In the machining process itself the coagulum was elastic rather than plastic; it did not roll out easily, and the finished sheet was always too thick. Little or no importance was attached to the average thickness of the sheets or to prevalence of very thick places at the ends or sides. The sheets might or might not be soaked for a while in water after machining. They might be hung in a blazing sun to drain for a long or short period, or they might be piled in stacks with no draining period at all and left sometimes overnight before being taken into the drying chamber.

The smoke houses or drying chambers were numerous and large. Some were simply large barns with a fire in a pit in the floor; others had a brickwork furnace on the floor which might be fed from outside or inside the building itself. Temperature control was practically nil. Humidity might be anything. Drying thick irregular sheets was a prolonged and an irregular business which might take 8 to 14 days, and even then many white or virgin patches might be observed on sheets which were removed for packing. These wet patches had to be cut away by the sorters. Some sheets which by chance were less thick than others might be brought out several days before more irregular ones from the same crop. These were naturally lighter in color. Similarly, by some accident in design or location, one building might normally dry sheets more rapidly than its neighbor. This gave rise to much variation in color. The sorting, grading, and packing were usually carried out in a badly lighted building by operatives who sat on the floor, held up each sheet to such light as there was, and cut out those offending patches which they happened to spot. Naturally, many were overlooked.

Of course there was room for much improvement. Quick transport and centralization of manufacture might overcome the waste of man power on two or three complete small factories on one estate. The fact of small factories in different parts of one estate makes for variation, and greater uniformity should result if all the latex from the whole estate could be bulked before manufacture began. This should smooth out variations due to age of trees in different sections, the situation of the blocks whether on good or bad, hilly or flat land, and the adventitious bacterial contamination. Dirt and sand should be prevented from appearing in the sheets. The wooden and tiled coagulating tanks must harbor bacteria by the million in crevices, making a bad job worse. Tanks and machines should be better arranged, and this mutilation of coagulum by carrying, foot-stamping, and hand-rolling should be abolished. The coagulum should be soft and plastic, because if one is to smooth out variations at all, one must aim at a very thin sheet so that the rubber from one day's crop will not differ from that of another day by the presence of large amounts of occluded serum substances of doubtful composition and varying effects on properties. A thick sheet left about at a low temperature must have behaved not unlike a slab, and

bacterial decomposition must have produced the natural accelerators in it, thus affecting its rate of cure. This process must have continued in many cases in the slow drying which took place in the smokehouses. Thus thin sheets, washed and drained and quickly dried, are indicated. Drying should be better controlled.

MODERN DEVELOPMENTS. The institute's officers have been able to exert a useful influence during the last four or five years, in so far as Malaya is concerned. About the time a great deal of machinery was becoming ready for replacement the slump in rubber prices compelled estates to consider such things as man power and other factory costs. Estates and engineering concerns were only too pleased to consider the institute's suggestions for new machinery and better factory arrangements generally. About this time also there was a severe epidemic of smokehouse fires, and many estates were free to build new smokehouses at the expense of the insurance companies. The institute had taken records of the output of a large number of estate sheeting outfits and had found that few of them produced more than 300 pounds of rubber per hour. The coagulating tanks and therefore the pieces of rubber were too narrow and consequently too light. The rolls themselves were too slow, and no attempt was made to synchronize speeds to allow for the increased length of a given piece of rubber after each passage through the rolls. Further, each operative consumed as much time in picking up material from one side and finally passing it sideways to his Tamil neighbor on the other side as he did in actually putting the rubber through the rolls. This was an inefficient business, and here was the institute's chance to persuade estates to produce better quality rubber under the guise of being more efficient and cheaper. Success followed. At the same time authorities in the Netherlands Indies were doing likewise.

At the suggestion of the institute, engineering firms designed batteries of machines set in column instead of side by side, with water-filled trays between each machine. Wider rolls were standardized so as to make possible the use of deeper coagulating tanks lined with aluminum. The rolls were synchronized for speed so that pieces of coagulum followed each other end on end through the whole battery of machines with no delay and no strain on the operative. Instead of three machines, there were five or six so that a thinner sheet could be rolled without recourse to foot-stamping and hand-rolling. The output of a battery was actually raised in this way from 300 to 2,000 pounds of rubber per hour. These new sheeting batteries lend themselves to proper conveyance of the coagulum because it is possible to float or slide the coagulum to the first machine, after which it passes in a dead straight line through the whole outfit. The first new layouts had line-ahead batteries and a central sloping water chute down which the pieces of coagulum were shot from the coagulating tanks set on either side of it. The operatives merely lifted the pieces and shot them down to the machines. Still more recently the chute was replaced by a central water trough so arranged that, by flooding the coagulating tanks, the coagulum could be floated all the way from tank to machine with no lifting or carrying at all. The rapid production of thin uniform sheets which could be dried quickly and evenly with very few thick virgin patches thus became possible. The advent of high-output machinery and the better factory layout which it made possible resulted in the centralization of manufacture on many estates which previously had two or three subsidiary factories. Recognized factories included in their outfits at the institute's suggestion large bulking tanks. These have sloping bot-

oms and serve the dual purpose of bulking and sand removal. Here the latex is diluted to a fixed dry rubber content and allowed to deposit sand. The clean latex is run off through fine sieves into the coagulating tanks from a high-level cock leaving a residuum of sand-contaminated latex.

Thus in a number of factories low operating costs were combined with (1) the removal of some sand, (2) the ability to prepare, convey, and handle a very soft coagulum from which serum is readily squeezed out, and (3) an adequate number of rolls to give thin uniform sheets.

The institute's next step has been to encourage the erection of small-compartment smokehouses with accommodation for one day's crop in each of four compartments and no reserve space. This was a dastardly attempt on the institute's part to make sure that an efficient factory plant should be worked efficiently, because with no reserve drying space the smokehouse is the key point in the whole outfit; if the latex is not correctly coagulated and the coagulum not correctly handled and machined thin, the rubber is not dry in time and the whole estate is thrown out of gear. The factory must be operated efficiently. A number of estate managers have either fallen into the trap or gone into it with their eyes open. The result has invariably been the same—efficiency. The wet-machined sheets are hung on trolleys to drain for three hours and then trolleyed straight into their compartment for drying and smoking. Temperature and ventilation control are both far easier in these small buildings, and drying is uniform and efficient. The final result is uniform, clean, and reasonably quick-smoking, following uniform latex handling and manufacture.

Sorting and grading have been improved and cheapened by the adoption of large disks of ground glass illuminated from below. Quite small blemishes are easily spotted and removed.

Thus the last few years have seen some progress in the right direction. More and more estates are reequipping. The institute could never have persuaded estates to reequip for the avowed purpose of improving the inherent properties of the rubber, but only for the reason that reequipping also gives greater efficiency and reduces costs.

DRYING PERIOD. Why is the institute aiming at a drying period of four days and not two days or one day? The answer is that in this matter it is advisable to make haste slowly. The sheet should be dried without undue bacterial maturation and the variability in cure which it may produce, but other defects may be introduced by drying too quickly. In preliminary bomb-aging work with simple rubber-sulphur mixings from sheets dried in various periods, rapidly dried sheets have always given poor results. Similarly, manufacturers have complained that the light-colored, quickly dried sheet is too tough; while the darker sheet is softer and easier to handle on the rolls. So far not enough evidence is available on drying and its direct effects on inner properties. This may prove to be important. Hence the institute believes that the four-day drying period at present is the shortest safe period.

FACTORY CENTRALIZATION. To what extent can bulking be carried out from very large areas in one mighty factory prior to manufacture in order to achieve greater uniformity? The safe high limit of bulking—in other words, of centralization—is not high in practice. No matter how good transport facilities are, it takes a long time to move several thousand gallons of latex from the fields into the bulkers; premature coagulation and other troubles would undoubtedly prove troublesome, and day-

to-day variation introduced adventitiously from these troubles might well be as great as the variations which the bulking set out to remove. For easy handling, the practicable bulking limit seems to lie in the zone of 500 to 700 gallons, and it is unwise to exceed it. Practical difficulties upset theoretical considerations badly here. In this connection Sackett himself has provided us with some illuminating results which point unmistakably to the conclusion that the theory of large-scale bulking is one thing and its practice and practical value, quite another. Nevertheless, the growing movement toward better and more uniform preparation of rubber is in the right direction. It will eventually result in an estate product of better all-round quality. A perfectly uniform product from all Malaya all the time cannot be expected. Seasonal variations in rate of cure alone will prevent it because with better factory procedure these variations are not eliminated. Even with a uniform alternate-day tapping system, the bulking of rubber from a month's crop still shows seasonal variations as between one month's crop and another, so that an all-Malayan estate rubber of uniform cure is an ideal state which will probably not be achieved for a long time.

UNIFORM PLASTICITY AND AGING PROPERTIES. Evidence is lacking on these points. The institute expects its work directed toward finding ideal drying and smoking conditions to lead to the goal of greater uniformity in these properties. That is for the future.

UNIFORM WATER ABSORPTION. Experiments are in progress on the effect of various preparation factors on this property of rubber, and it will be easily possible to smooth out much of the present variation by taking greater care at certain essential stages. Without very special pretreatment of latex, however, it will not be possible to reduce the average water absorption to a value much below 0.4%. Chemists who hope for a rubber with water absorption of the order of 0.001% or less will never get it in rubber manufactured even by present methods for present market requirements. The institute is working on special methods of preparing low-absorption rubber, but progress cannot be reported at this stage.

DANGEROUS CHEMICALS. With regard to the use of dangerous chemicals on estates, there is no cause for worry. One or two estates did use sulphuric acid for a while, but the institute's warning against it has been effective. It is not certain that sulphuric acid is really dangerous when properly used as it was in these cases. No estates are using manganese- or copper-bearing chemicals. There was a recent case of manganese contamination which affected Sackett and, later on, the writer. Here the source of manganese was traced to an exceptional water supply. There was no question of the estate's having deliberately used a dangerous chemical. Nobody knew at the time that the water employed was other than quite satisfactory. That sort of defect will not appear again in rubber from that source and quite probably not anywhere else. Sackett suggests that all estate water supplies should be checked for the presence of manganese. A large number have already been checked; and this necessary work will continue.

(To be concluded)

Labor Nationalities

(Continued from page 37)

covering employment on estates of all kinds in Sumatra East Coast are sufficiently indicative of the situation. Estates there have for many years faced the possibility that the government would abolish the penal clause in labor contracts, and were gradually increasing the per-

centage of free labor in preparation for this action. The depression facilitated the changeover to a free labor basis to a considerable degree, when the government finally took action on the matter in 1932.

TABLE 4. ESTATE EMPLOYMENT IN SUMATRA EAST COAST

Year	Contract Labor	Free Labor	Total Number	% Javanese	% Chinese
1926.....	223,219	25,107	248,326	87.7	11.5
1927.....	239,270	29,579	268,849	88.2	11.1
1928.....	250,558	33,127	283,685	88.7	10.7
1929.....	261,619	41,084	302,003	90.3	8.7
1930.....	236,285	49,000	285,285	91.2	8.0
1931.....	137,636	88,059	226,095	91.0	8.2
1932.....	27,838	140,499	167,837	89.9	8.2

Source: "Annual Reports of Labor Dept.," Netherlands India.

The situation on free versus contract labor in Sumatra, where the supply of sufficient labor before the depression was always the most important question, probably impeded the development of racial competition in rubber estate labor which shows up clearly in Malayan statistics. It is said that in Sumatra East Coast, Chinese have been employed mainly on tobacco estates. However planters there are quick to adopt new methods, and it would not be surprising if the rubber estates should turn more to Chinese in future.

The statistics show the same trend toward reduction of labor forces as was shown for Malaya. Beginning in 1930 departures of Javanese from Sumatra have steadily exceeded arrivals, at least until 1934. Only one-fourth of the Javanese estate employes on Sumatra East Coast estates in 1932 were women, and a resident population can be built up only gradually. As recruiting of additional labor becomes necessary, the Chinese may become a far more important labor element there than in the past.

Para-Graphs

RUBBER BASE PAINT. The use of latex, rubber, and its modified forms is becoming popular in manufacturing paints and other special purpose coatings for which this paint furnishes protection against the action of acids and other corrosive materials upon metals for industrial, architectural, and other purposes.

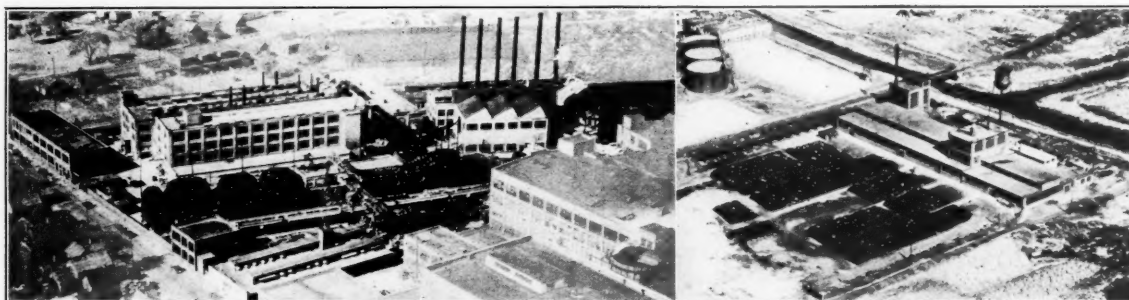
POROUS EBONITE BATTERY PLATES. According to a preferred method, a rubber mixture is made with a sulphur content such that complete vulcanization produces a soft rubber. This vulcanization is so judged as to produce a soft rubber which can be crumbled, for example, by a rolling mill or like cracking machine; and care must be taken against over-vulcanization. The sheets of rubber, after full vulcanization, are passed through the rolls of a grinding mill or through a cracking machine until a fine crumb or powder results. This crumb is mixed with water or other suitable liquid containing a wetting medium, such as Igepon T, or other material, in which is a dispersion of sulphur or enough colloidal sulphur to bring the whole mixture to a sulphur content of 32% which, after vulcanization, will produce a complete ebonite not attacked by peroxide or nascent oxygen at the positive electrodes of the secondary cell. The powders can either all be mixed dry or some or all mixed with water. The moisture content is so adjusted that the material will flow easily into a mold either as by pouring, rolling, extrusion, or by centrifugal means.

After the molds are filled and pressed together, vulcanization is preferably carried out in open steam. During vulcanization the sulphur in the aqueous dispersion of sulphur surrounding the rubber particles combines with the rubber particles and knits them together, leaving between the particles a multiplicity of uniform interstices by reason of the evaporation of the water content.

Contributors to Rubber Compounding Progress

The Philadelphia Rubber Works Co. Activities Mark Steps of Reclaiming Development

D. C. McRoberts

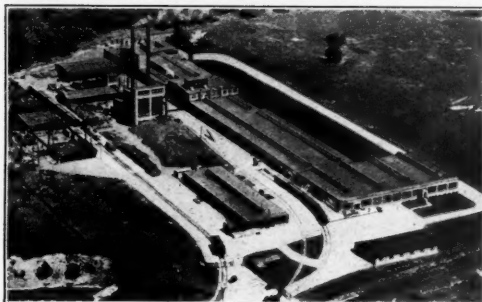


Main Reclaiming Plant of the Philadelphia Rubber Works Co., Akron, O., Recently Enlarged and Modernized

A CLOSE relation invariably exists between the historical events of any company that has contributed to the progress of rubber compounding, and the actual achievements that stand out as its definite contributions; and both are interesting indeed. This statement is especially true of The Philadelphia Rubber Works Co., a reclaiming concern, rich in tradition, organized in 1880, as a contributor¹ in commercializing the acid process rubber reclaiming invention of its founder, Lieutenant Colonel Nathaniel Chapman Mitchell.

The Acid Process Discovery

Ground rubber scrap had been used in rubber compounding many years earlier, as evidenced by a patent issued to Charles Goodyear in 1853, but this practice was largely limited to the utilization of fabric-free rubber waste. That a desire existed to reuse all scrap rubber, most of which was then boots and shoes, was revealed by the partially successful method of Clapp in 1871 to remove fiber by air separation after fine grinding. Other and later attempts to eliminate fiber by chemical means were unsuccessful until Colonel Mitchell, working in his laboratory, found, during the latter part of 1879, that the desired objective could be achieved by the use of dilute sulphuric acid followed at the proper time by a neutralizing soda treatment. Literature of that day informed him that acid would decompose india rubber, but



The Plant in Oaks, Pa., Now Serving as Stand-by Capacity

Philadelphia Rubber Works Plant No. 2, Kenmore, O.

his experiments proved that this statement did not hold true under properly regulated conditions.

As a result of these experiments the acid process of today was developed; a business association with J. M. Stotesbury was formed; and The Philadelphia Rubber Works Co. was founded in 1880. THE INDIA RUBBER WORLD, May, 1895, page 240, said, "The oldest of the rubber-reclaiming companies is that at Philadelphia, of which N. Chapman Mitchell is president and J. M. Stotesbury secretary."

The Pan Process Development

The fiber-free vulcanized rubber mass resulting from the acid treatment of shoes was softened by prolonged heating with steam. Variations in this practice finally resulted, before 1890, in the more or less standardized procedure of filling shallow pans with the rubber sprinkled with oil, stacking the pans in an open steam pressure vessel, devulcanizing, aging, and then milling the rubber into homogeneous slabs. This method, prevalent today, is known as the "pan process."

A Short-Lived Syndicate

Perhaps very largely as the result of disputes and litigation incident to the origin, and because of promising financial returns from the relatively new reclaiming inventions, a combination of the five existing manufacturers was formed May 9, 1891, under the name Rubber Reclaiming Co., with N. C. Mitchell, president; Royal M. Bassett, vice president; Mr. Morganstern, treasurer; and C. Edward Murray, secretary. Mr. Morganstern soon

¹ Other contributors in this series: Naugatuck Chemical, INDIA RUBBER WORLD, June 1, 1935, pp. 39-41; New Jersey Zinc Co., *Ibid.*, July 1, 1935, pp. 31-34; Binney & Smith Co., *Ibid.*, Sept. 1, 1935, pp. 30-34.

resigned because of ill health, and R. A. Lowenthal, his business partner, was chosen to fill the vacancy.

Each constituent manufactory, including The Philadelphia Rubber Works, was leased for a period of ten years by the syndicate. Business was excellent; some plants were enlarged and made more efficient and thus produced the bulk of the requirements. Divergent ideas of the officers regarding the right of any of them to engage individually in rubber waste trading led to discord and later to liquidation of the syndicate May 6, 1895. The unexpired six years of the plant leases were cancelled, and The Philadelphia Rubber Works and the others were privileged to resume business on an individual and competitive basis.

The Alkali Process

United States patent No. 635,141 issued October 17, 1899, to Arthur Hudson Marks, then superintendent of the Diamond Rubber Co., Akron, O., describes the results of his experiments to decompose the fiber of waste rubber and plasticize the latter with caustic soda while being agitated under steam pressure. This discovery of the fact that vulcanized scrap could be plasticized and defibered simultaneously under heat and pressure gave new impetus to the industry. It was with the development of the automobile that the real importance of this discovery became apparent.

In 1904 the Alkali Rubber Co. was organized to manufacture reclaimed rubber by the alkali process under the Marks patent. The officers were men prominently identified with both the Diamond Rubber Co. and The B. F. Goodrich Co.; namely, A. H. Marks, president; Bertram G. Work, vice president and treasurer; George G. Allen, secretary. In addition to these as directors were Colonel George T. Perkins and Ohio C. Barber.

Formation of the Present Company

J. K. Mitchell succeeded his father as president of The Philadelphia Rubber Works. In 1910 a merger of The Philadelphia Rubber Works of Philadelphia and the Alkali Rubber Co. of Akron, under the name of The Philadelphia Rubber Works Co., brought the control of the alkali process to the new corporation, of which J. K. Mitchell was president, A. H. Marks, vice president, and J. S. Lowman, secretary. This established the company with facilities for manufacturing reclaims by both processes; an acid plant in the East, and an alkali plant in the Midwest.

Rubber Science Required

To this approximate point of time, 1912, such limited research attention as had been addressed to reclaimed rubber pertained essentially to the processes of manufacture, not to the refinements of quality and workability effects that were rapidly becoming required properties of compounding materials by the more scientifically prepared rubber formulations. The rapid increase in the number of products made of rubber, and the increasing use of organic accelerators, together with the later application of carbon blacks, presented new and complex problems to the reclaimer. Rubber compounding and vulcanization had entered a truly scientific era.²

Thus came the necessity of enlarging the functions of

² INDIA RUBBER WORLD, June 1, 1935, p. 39.

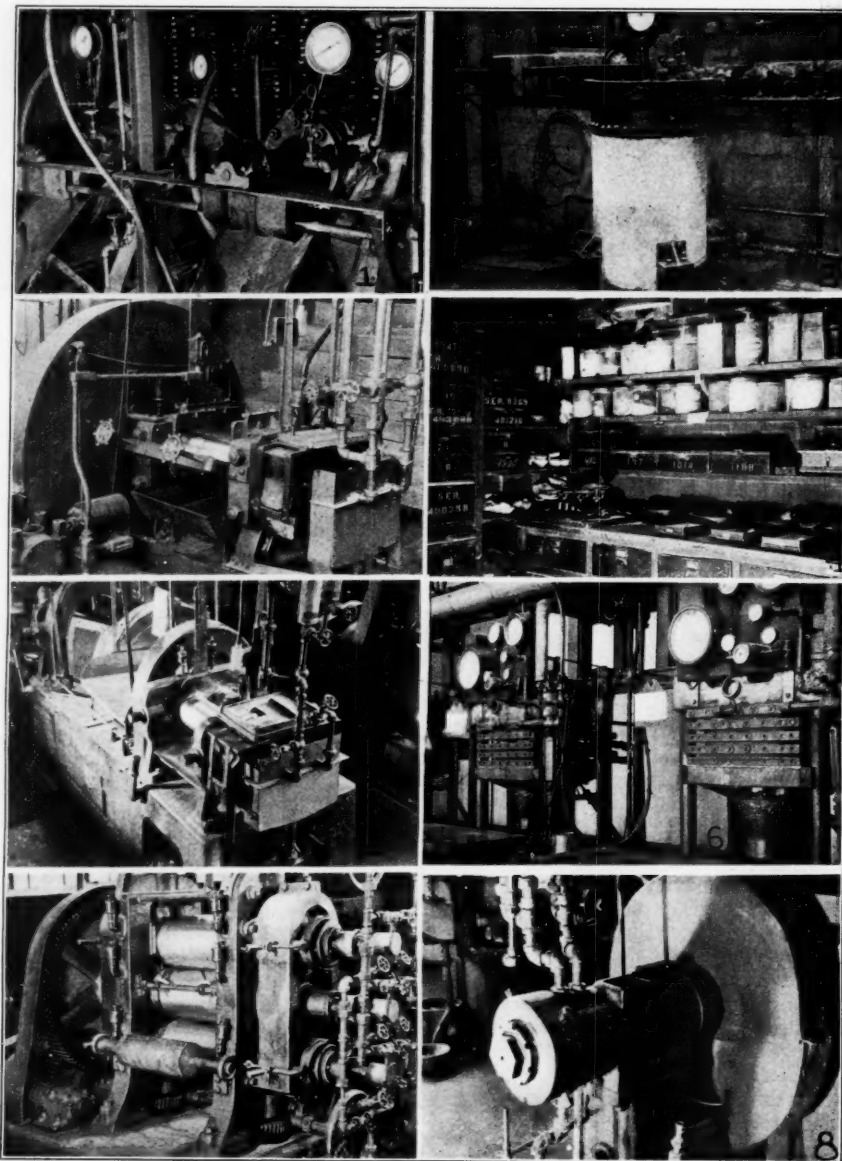


Fig. 1. Miniature Digestors Used in Processing Investigations; Fig. 2. Autoclave for Pan Process Experiments; Fig. 3. Laboratory Refiner for Finishing Experimental Reclaims; Fig. 4. View of Laboratory Compound Room Where Both Reclaim and Rubber Formulae Are Prepared; Fig. 5. Experimental Mixing Mills; Fig. 6. Platen Presses for Curing of Reclaim and Rubber Compound Test Samples; Fig. 7. Laboratory Calendar for Workability Tests; Fig. 8. Small Extruder for Workability Tests

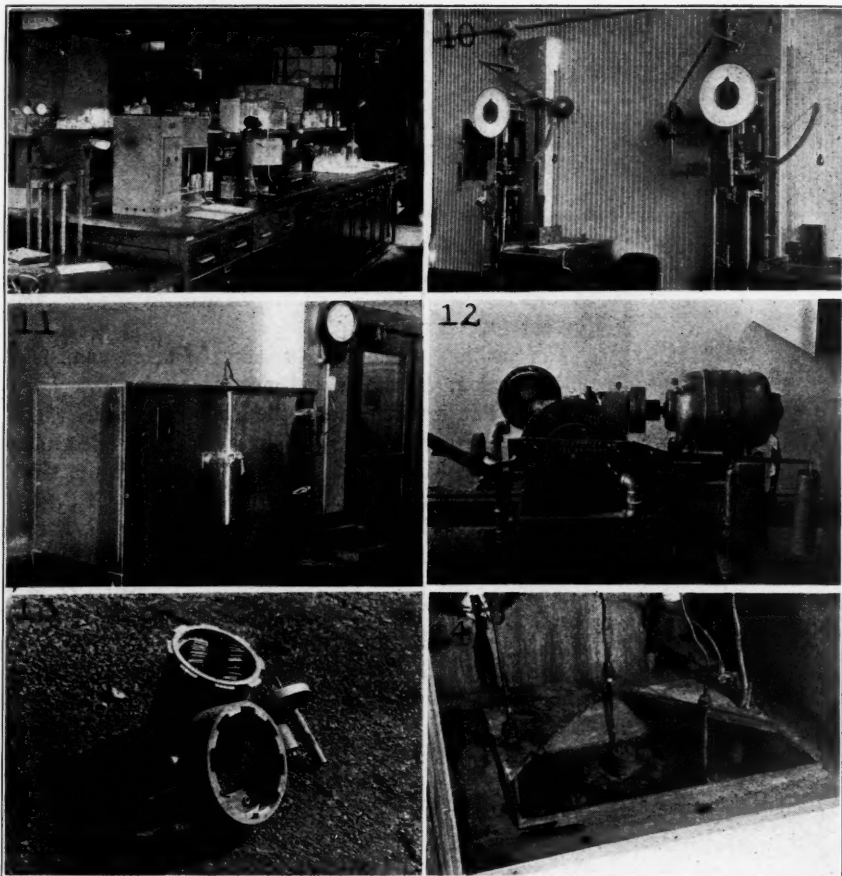


Fig. 9. View of the Chemical Laboratory; Fig. 10. Scott Tensile Testers; Fig. 11. Freas Electric Air Aging Oven; Fig. 12. Grasselli Abrasion Resistance Machine; Fig. 13. Bierer-Davis Oxygen Bomb Loaded with Samples for Age Test; Fig. 14. Special Water Bath for the Oxygen Bomb

the scientific departments of progressive reclaimed rubber manufacturers from the simple mechanical routine of specific gravity, ash and acetone extract determinations, by adding that of genuine rubber research by scientists well versed in rubber theory and practice, utilizing apparatus designed to evaluate reclaims from the rubber compounding point of view.

Scientific Policies

With characteristic alertness the management of The Philadelphia Rubber Works Co. expanded its laboratory facilities and studied reclaimed rubber as a major ingredient for rubber compounding. As the result of this policy, the Manufacturing and Technical Divisions have contributed many types of reclaimed rubber designed especially for the rubber goods in which they are to be used, and a policy of giving all possible enlightenment concerning reclaimed rubber compounding practice.

Technical Facilities

E. B. Busenburg, chief chemist, directs the technical activities of the company, assisted by a staff of experienced technicians. The chief activities of these men are concerned with the development of new and improved reclaims and new uses for reclaimed rubber and, through a control organization, the quality and uniformity of the finished product.

This organization, which is thoroughly experienced in the practical phases of rubber compounding, also devotes a large part of its time to applying reclaimed rubber to special problems for the rubber manufacturing trade.

The mechanical facilities of The Philadelphia Rubber Works Co. necessary to modern reclaim research and control include not only miniature equipment for every type of reclaiming operation, but also equipment adapted to rubber compounding and testing.

It can be said truly that this company has done its part in the transition of the former sobriquet "shoddy" to the more respectful and thoroughly deserved name "reclaimed rubber."

Recorded Contributions

The following bibliography lists a number of the enlightening contributions that have been presented by members of The Philadelphia Rubber Works Co. research staff since the beginning of the rubber science period:

"Behavior of Various Clays with Crude and Reclaimed Rubber." H. A. Winkelmann and E. G. Croakman, *Ind. Eng. Chem.*, Aug., 1930, pp. 865-69.

"Effect of Stearic Acid on Reclaimed Rubber." H. A. Winkelmann and E. B. Busenburg, *Ibid.*, Aug., 1929, p. 730.

"History and Trends in the Use of Reclaimed and Scrap Rubber." H. A. Winkelmann, *The Rubber Age (N. Y.)*, Aug. 25, 1929, pp. 544-47, 561.

"New Developments with Dispersed Rubber." H. A. Winkelmann, *INDIA RUBBER WORLD*, July, 1928, p. 53.

"Pigment Reinforcement of Reclaimed Rubber." H. A. Winkelmann and E. G. Croakman, *Ind. Eng. Chem.*, Feb., 1928, p. 134.

"Present and Future Reclaimed Rubber." H. A. Winkelmann, *Ibid.*, Nov., 1926, p. 1163.

"Rosin and Rosin Oil in Rubber and Reclaimed Rubber." H. A. Winkelmann and E. B. Busenburg, *A.S.T.M.*, Vol. 30, Part 2, pp. 807-27.

"Utilization of Waste Rubber." E. B. Busenburg, *Trans. Inst. Chem. Eng.*, Vol. 8 (1930).

"Water Absorption of Rubber Compounds." H. A. Winkelmann and E. G. Croakman, *Ind. Eng. Chem.*, Dec., 1930, pp. 1367-70.

Preparing Thiuram Disulphides¹

Ammonium and alkali metal salts of dithiocarbamates may be readily and effectively oxidized to the corresponding disulphides by using ammonium persulphate. The preferred method is treatment of the dithiocarbamate salt with the theoretical quantity of ammonium persulphate in an aqueous medium. A feasible method of preparing tetramethyl thiuram disulphide follows. Preferably 90 parts of dimethyl amine are dissolved in water to form a solution of 8 to 10% concentration, to which are added 150 parts of carbon disulphide and 85 parts of a 20% solution of sodium hydroxide in water. The product, sodium dimethyl dithiocarbamate, is then oxidized to thiuram disulphide by adding 240 parts of ammonium persulphate in 20% water solution. Tetramethyl thiuram disulphide precipitates and, after separating, washing with water, and drying, is obtained as a white powder with a melting point of 143 to 145° C.

¹ U. S. patent No. 2,014,353, Sept. 10, 1935.

EDITORIALS

Greetings

THE publishers and staff of INDIA RUBBER WORLD wish for all abundant peace, happiness, and prosperity throughout the new year.

The 1936 Business Problem

AS WE pass another of the fleeting milestones of time, our minds by instinctive habit turn to a panoramic review of the events of the past year for whatever lessons they have taught that will aid in laying plans for the promotion of progress and prosperity during the new year ahead. In retrospect the causes of our past failures become clearly discernible; likewise the weaker phases of our successful ventures can be more accurately evaluated. Both circumstances afford a basis for effectively forecasting the means of further advancement.

The book of 1935 now is closed; and within, we hope, are sealed forever such unpleasant experiences as tended to jade our spirits. After the many trying years just passed we should not fail to be fully appreciative of the substantial business recovery of the last two years, and particularly of the measurable advance of 1935 over the previous year. We can face the new year with a full measure of confidence and determination that our properly directed individual and collective thoughts and efforts will inevitably bring about the much desired continuation of business advancement. After all, business does not improve of itself, but rather because of the concentrated intelligence continuously directed to it and to the contemporaneous influences that detrimentally or beneficially affect it.

Within this year a most momentous problem must be decided. During the past century and a half the United States has grown from a position of insignificance to one of outstanding leadership industrially among the nations of the world, and this under a *laissez-faire* governmental policy. The present administration has chosen to disregard this achievement and discard this policy. It has injected its influence strenuously into the conduct of all business, as every citizen well knows. Whether or not business recovery so far is due to this influence or whether recovery has progressed despite it is not the province of this editorial to debate. Suffice it to say that business as well as every person in any way interested in business will be compelled to enter the political arena—to an extent never before required—to exert at least

a tempering influence, if not one of actually ejecting the present federal policies.

The position of industry has already taken unmistakable direction. At the annual meeting of the Associated Business Papers, Inc., and of the National Conference of Business Paper Editors, held in New York, December 2, 1935, resolutions were passed: (1) to urge the Government to disengage itself with the conduct and management of business; (2) to recommend that Congress suspend its Social Securities commitments pending a more thorough study of their application; and (3) that the Government agencies curtail excessive expenditures and give attention to a soundly balanced budget.

Next came the 1935 Congress of American Industry and the fortieth annual meeting of the National Manufacturers Association at the Commodore Hotel, December 4, in which a seven-point platform was adopted as follows: (1) maintenance of constitutional guarantees and protection of the American constitution; (2) preservation of individual enterprise; (3) elimination of undue regulation of private business; (4) opposition to excessive taxation, unsound Government financing, and excessive federal expenditures beyond the normal operating expenses of Government; (5) establishment of a national currency upon a dollar of fixed gold content; (6) adherence to the natural theory of "economic progress" as the best means for social security; (7) adherence to the "American" system.

Further in this direction the speech of Alfred P. Sloan, Jr., president of General Motors, clearly sets forth the divergent future paths of industry and the administration. The theme was stated thus:

"Industry must further expand its horizon of thinking and action. It must assume the role of enlightened and industrial statesmanship. To the extent that it accepts such broadened responsibilities, to that degree does it assure the maintenance of private enterprise."

The climax of discordant trends was reached at the meeting held in Washington, December 9, by Major George L. Berry, Coordinator for Industrial Cooperation, where discussion was suppressed and disorder and dissension prevailed between the proponents of Government policy and those of industry.

D C McRoberts
EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meetings

Los Angeles Group

THE twenty-fifth regular business meeting of the Los Angeles Group, Rubber Division, A. C. S., was held November 14, 1935, in the Recreation Hall at the University of Southern California. Owing to the absence of Chairman Hucks and Vice Chairman Pickard, Secretary R. E. Hutchinson presided. Minutes of the previous meeting were read and approved. Cash on hand was \$40.05.

Membership committee was appointed consisting of B. E. Dougherty, chairman, R. E. Abbott, Ed Royal, and H. F. Parkerton.

Entertainment committee was appointed as follows: Ed Royal, chairman, Carl Stentz, and Art Wolff.

Nominating committee was named to nominate officers for the coming year. Report and election will be at the December meeting. Those appointed were: Wm. Reeder, United States Rubber Co.; Chas. Lamb, West American Rubber Co.; B. E. Dougherty, B. E. Dougherty Co.

After the appointment of the various committees Mr. Blaz of the Goodyear Tire & Rubber Co. introduced the speaker of the evening, Raymond B. Stringfield, who spoke on "Synthetic Resins in Industry." This talk was well illustrated with many samples of the various synthetic resins as well as numerous useful articles made from them. The interest of the group was evinced by lively discussion and questions.

Akron Group

THE Akron Group, Rubber Division, A. C. S., held its first winter meeting December 6 at the Akron City Club. Following the customary dinner the meeting listened to a highly informative lecture by A. L. Ely on the subject "Patents in the Rubber Industry." Mr. Ely is recognized as an eminent authority on patent laws as they affect the rubber industry.

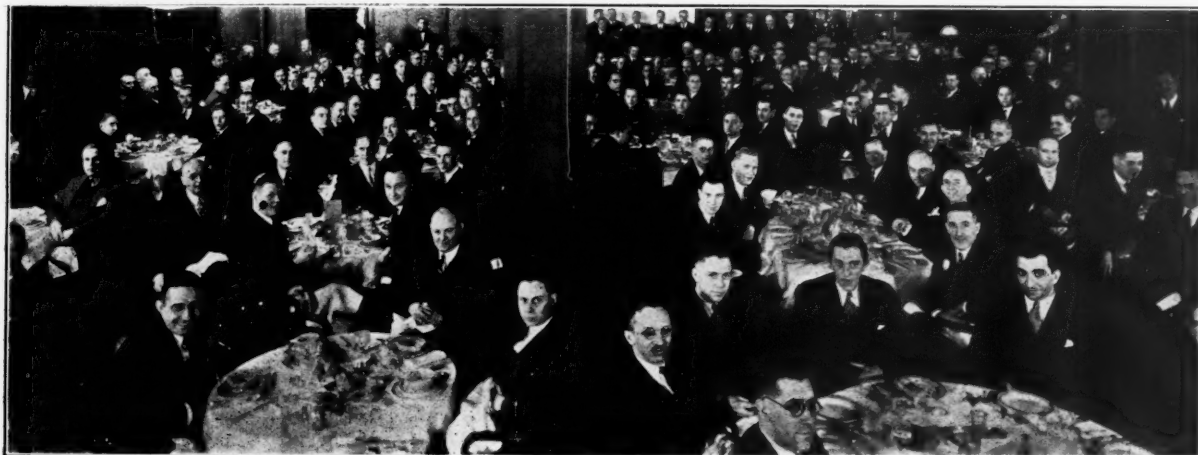
New York Group

THE annual Christmas party of the New York Group, Rubber Division, A. C. S., was held at the Building Trades Employers Association club-rooms, 2 Park Ave., New York, N. Y., at 6.30 p.m., December 20, 1935. About 280 members and guests were present for the turkey dinner and the entertainment that followed. A short business session was held which consisted mainly of the recommendations of the nominating committee for 1936 officers by Chairman C. A. Bartel and their subsequent unanimous election. They are as follows: chairman, R. D. Gartrell, U. S. Rubber Products, Inc., Passaic, N. J.; vice chairman, J. Miscall, Flintkote Corp., Rutherford, N. J.; secretary-treasurer, P. P. Pinto, *Rubber Age*, New York, N. Y.; sergeant-at-arms, W. H. King, Pocono Co., Trenton, N. J.; executive committee, W. F. Russell, R. T. Vanderbilt Co., New York; J. W. Ayers, C. K. Williams & Co., Easton, Pa.; A. R. Lewis, Rubber Ser-

vice Laboratories Co., Nitro, W. Va.; Paul Lupke, Jr., Essex Rubber Co., Trenton; J. H. Ingmanson, Bell Telephone Laboratories, Inc., New York; R. R. Lewis, Vulcan Proofing Co., Brooklyn, N. Y.; L. D. Ackerman, Seamless Rubber Co., New Haven, Conn.; Bruce R. Silver, New Jersey Zinc Co., New York.

A. R. Kemp and F. S. Malm, Bell Laboratories, presented a paper on "Business in Deep Waters," followed by moving pictures depicting in an absorbing fashion the laying of the latest deep-sea cable from Newfoundland to the Azores. Other moving pictures that proved to be of great interest concerned the hazards and thrills of sea fishing, and those that covered the activities of the June picnic at Preakness, N. J.

The following donors of merchandise or cash provided a great variety of useful and valuable gifts, some of which were distributed to all as favors; while the remainder were given to the holders of lucky tickets: American Cyanamid & Chemical Corp., Anaconda Sales, Best Pencil Co., Godfrey L. Cabot, Inc., Binney & Smith Co., Callaway Mills, Inc., Carter Bell Mfg. Co., Curran & Barry, E. I. du Pont de Nemours & Co., Inc., Endicott-Johnson Co., Flintkote Corp., General Atlas Carbon Co., Givaudan-Delawanna, Inc., Imperial Color Works, INDIA RUBBER WORLD, H. Muehlstein & Co., Inc., Naugetuck Chemical, New Jersey Zinc Co., Quaker City Rubber Co., Pequannoc Rub-



New York Group Christmas Party

ber Co., Pocono Co., Philadelphia Rubber Works, Rare Metal Products Co., *Rubber Age*, Rubber Service Laboratories Co., St. Joseph Lead Co., Schavoir Rubber Co., Henry L. Scott Co., A. Schrader's Son, Southwark Mfg. Co., Stamford Rubber Supply Co., C. J. Tagliabue Mfg. Co., Titanium Pigment Co., Inc., United Carbon Co., R. T. Vanderbilt Co., Vansul, Inc., Vulcan Proofing Co., Wishnick-Tumpeer, Inc., Woburn Degreasing Co.

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., held its Christmas meeting December 20 at the Hotel Sherman, Chicago. Dinner was served in the College Inn of the hotel. Music was furnished by George Olson and his

orchestra, songs by Ethel Shutta, and a thrilling skating show.

The technical portion of the program was held in the Crystal Room. Walter P. Voth, of The Akron Standard Mold Co., described a new automatic press of revolutionary design. Its structural features were shown in moving pictures, and considerable discussion followed the presentation.

An interesting travel talk was delivered by Dr. Owen R. O'Neil covering a trip to Swaziland, South Africa. He recounted human incidents that came to his notice during his many years' residence in that country.

Following Doctor O'Neil's talk Christmas gifts to seventy-five lucky number holders were distributed to

group members. These gifts were donated by the following: L. Albert & Son, American Zinc Sales Co., The Barrett Co., Binney & Smith Co., Godfrey L. Cabot, Inc., E. W. Colledge, G.S.A. Inc., Commerce Petroleum Co., E. I. du Pont de Nemours Co., Inc., General Atlas Carbon Co., The C. P. Hall Co., Herron & Meyer, International Smelting & Refining Co., H. Muehlstein & Co., Inc.; Naugatuck Chemical, New Jersey Zinc Sales Co., Procter & Johnson, Inc., RIT Products Co., Rubber Service Laboratories Co., A. Schulman, Inc., United Carbon Co., U. S. Rubber Reclaiming Co., Inc., R. T. Vanderbilt Co., Inc., Wilson Sporting Goods Co., Wishnick-Tumpeer, Inc., Xylos Rubber Co.

Sprayable Chlorinated Rubber¹

A. M. Ball and A. R. Olsen

A CHLORINATED rubber product with interesting properties has recently been introduced in this country by the Hercules Powder Co. This material, known as Tornesit, is soluble in such solvents as toluene, xylene, ethylene dichloride, and carbon tetrachloride. Such solutions, when modified by the addition of suitable softening agents and pigments, form lacquers that can be used for the decoration and protection of wood, concrete, and metals. Tornesit solutions can also be used for coating paper and cloth to give a glossy, moisture-proof finish, and for impregnating cloth to stiffen it.

The value of Tornesit in protective coatings lies in the great resistance to all kinds of corrosion, including alkalis, acids, salt water, petroleum products, and alcohol, and its lack of combustibility. In places where ordinary paints and lacquers fail rapidly owing to exposure to corrosive atmosphere, Tornesit finishes remain unaffected and protect the material underneath. In paper and cloth work the fact that Tornesit is extremely difficult to burn makes it preferred for many uses to other coating and impregnating materials.

Until the present time protective coatings of Tornesit have had to be applied by brushing because when attempts were made to spray it, the lacquer came out of the spray gun in long strings. This effect, known as spider-webbing, naturally gave rise to finishes of undesirable appearance. After several months' investigation of the causes of this behavior and its correction, a new sprayable type of Tornesit has been evolved, which can be applied in exactly the same way that nitrocellulose lacquers are applied and can, therefore, be used without special precautions by anyone having the required skill and equipment for the use

of nitrocellulose lacquers.

Sprayable Tornesit does not differ in any essential property from the older types except in viscosity. Its resistance to corrosion, its life in finishes, are exactly the same as for other kinds of Tornesit. The difference in viscosity, however, permits the use of higher concentration of Tornesit for a lacquer of a given viscosity or "body." That means that less solvent is used per unit of Tornesit and tends to bring down the cost of Tornesit lacquers when figured out on the basis of the area covered.

The viscosity of solutions of high

molecular weight, including cellulose and rubber derivatives, is related to the molecular weight of the dissolved material. There is a fairly definite range of molecular weights below which these materials do not have the property of forming strong films. Nitrocellulose of the viscosity of sprayable Tornesit would have too low a molecular weight to be in the film-forming range. However the relation between viscosity and molecular weight is not the same for rubber derivatives as for cellulose derivatives, and the molecular weight of sprayable Tornesit is within the range of good film formation.

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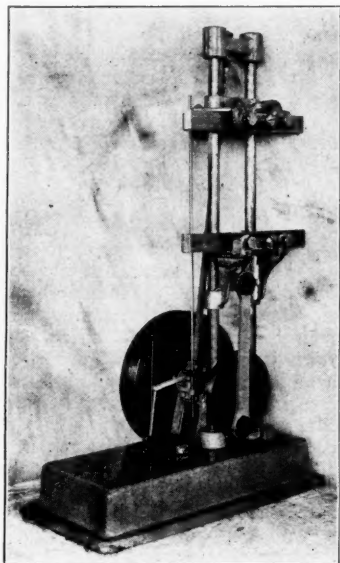
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(Continued on page 74)

¹ Paper presented before the Paint and Varnish Division, A. C. S., San Francisco, Cal., meeting, Aug. 19 to 23, 1935.

New Machines and Appliances



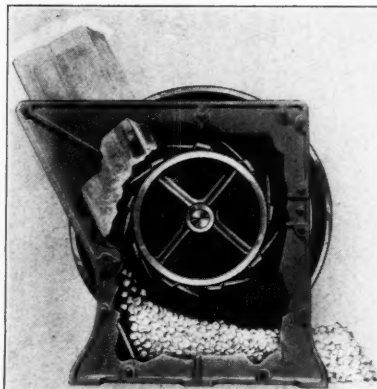
National Flexing Machine—Model D

Rubber Testing Machine

AN IMPROVED model reciprocating machine for testing flexing characteristics of rubber stocks is here illustrated. The chief difference between this and the earlier model by the same maker is that the reciprocating jaw is made of aluminum to reduce momentum. The jaws themselves have been lengthened 13 inches in order to take care of about 12 test pieces at one time. The flywheel has been increased in weight to reduce uneven return at the end of the stroke. A control attachment has been arranged to provide automatic cut-off when the last of the test pieces breaks, thus giving a correct reading at all times without the need of constant supervision. National Rubber Machinery Co., Clifton Division, Clifton, N. J.

Material Crusher

THE breaker pictured is designed for crushing frangible massive materials to pieces of suitable sizes convenient for handling, as, for example, hard mineral rubber for mixing in rubber. The breaking is accomplished by sharp pointed picks held by friction in sockets in the periphery of a heavy cast-iron rotating drum. The size of the broken material is determined by interchangeable combs through which the broken pieces must pass before leaving the machine. These combs may be changed and other features adjusted to break materials down to about the size of the finger tips. The machines are furnished in capacities ranging up to

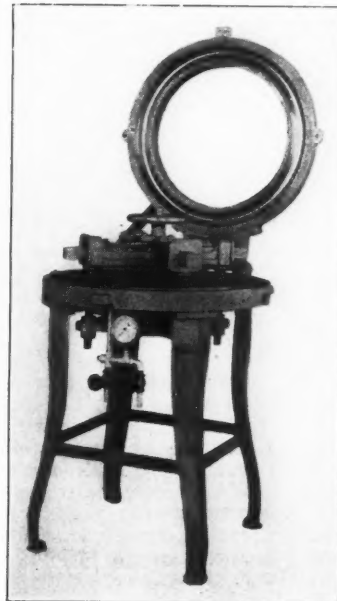


Creasey Material Breaker

50 tons per hour, capable of handling pieces of material as large as full size cakes of ice. Cochrane Corp.

Bicycle Tire Mold

THE mold pictured consists of a stand combined with a pressure device for holding the molds together while the tire is being cured. The mold plates are hinged, and no bolts are required to hold the molds together during the cure. Under the molds a diaphragm exerts four to six tons of air pressure which forces the lugs down on the upper half of the mold and clamps the molds together firmly. It requires only one-fourth turn of a hand wheel to do the work. When the tire has been cured, all that is necessary is to release the air pressure and give the hand wheel one-



Miller Bicycle Tire Mold

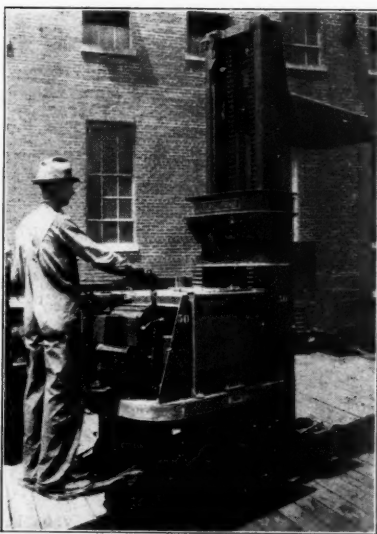
fourth turn; the pressure bars are reversed, and the upper half of the mold can be raised and the tire removed. Chas. E. Miller Corp.

Elevator Truck

THE modernized tiering truck illustrated has a capacity of 6,000 pounds, either electric or gas-electric powered. The frame is built of extra-large commercial shapes, securely reinforced with heavy angles and gusset plates, welded or riveted. This provides not only for normal loading, but insures rigidity of the frame even when the platform is at maximum height. Ball socket steering rods are located inside the wheel base.

Safety control automatic cut-out switches are provided to stop the platform at both upper and lower limits of travel. Moreover platform travel may be manually stopped at any height and held there by a spring-actuated electro-mechanical brake. Interlocking control between travel controller, drive motor, and foot pedals make the truck virtually proof against accident.

The truck itself is 41 inches wide and 128 inches long with a 27- by 54-inch platform. The height of the platform in low position is 11 inches. The truck steers on all four rubber tired wheels and turns in 66-inch intersecting aisles. With this combination of minimum width and height the truck can readily be used in the open as well as in cramped quarters. The Elwell-Parker Electric Co.



Type ELN-6 Tiering Truck

Tire Grooving Device¹

THE device pictured represents a machine for grooving pneumatic tire treads either crosswise or circumferentially. The machine comprises a frame (1); a holder member on the frame (2); a reciprocative cutter carrier (3) pivotally carried by the holder. Angular stops and radial projections not indicated have inclined coactive slopes and function to regulate and limit the swing of the cutter carrier and also to lock the cutter in a definite diametric direction.

¹ U. S. patent No. 2,015,635, Sept. 24, 1935.

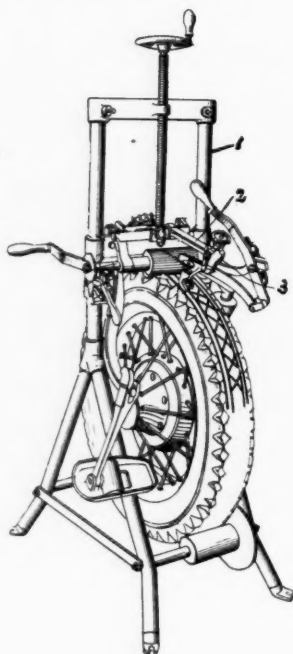
Giant Tube Vulcanizer

NATIONAL RUBBER MACHINERY CO., Akron, O., is announcing in this issue of INDIA RUBBER WORLD a giant tube vulcanizing unit, electrically operated. Officials report that this is the largest unit vulcanizer for curing inner tubes ever produced. It is along the same general lines as their bicycle tire and passenger tire curing units.

It is noiseless in operation, without vibration, and can be made automatic as well as hand operated. Notable among its features are: single adjustment for pressure, rapid, quiet, and efficient operation through enclosed oil-tight simple screw drive, and an especial feature is that in the open position one man can easily insert and remove the cured tubes from the floor level. There is also an insulating chamber outside the mold that greatly reduces condensation. The opening and closing times are eight seconds each.

Welding Torch

THE new general duty welding torch shown in the illustration embodies refinements in mechanical design and operation that make it outstanding among welding torches. It is rugged and in range of usefulness is equally adapted to the lightest as well as the



Tire Groover

heaviest work to be found in any welding shop.

The ribbed design of the extruded brass handle reinforces the torch and enables it to be gripped easily. The connections are ferrule type and extend parallel to the axis of the handle. The individual mixers in each welding head are so designed that maximum resistance of flashback is afforded, and at the same time the effective range of each size tip is greatly increased. Nine



(Above)
Purox No. 35
General Duty
Welding Torch



Giant Tube Vulcanizing Unit



GE Switch

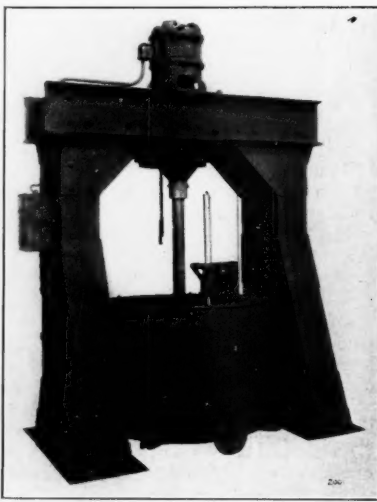
tips perform the duty of fifteen, the number usually required. The Monel metal seating surfaces are protected, wear-resistant, and easily removable for cleaning or replacement. A hexagonal socket arrangement permits the welding head to be assembled in the most convenient of six optional positions in relation to the body. This arrangement also prevents injury or scoring of the seating surfaces. The tips, of hard-drawn copper, are of the right weight to withstand excessive heat and to maintain perfect balance in the torch as a whole. The Linde Air Products Co.

Push-Button Master Switch

A NEW line of watertight push-button master switches is presented. They are mounted in molded phenolic-compound enclosures and intended for naval-type installations or equivalent industrial applications. Each unit is operated by a molded-compound lever, thus protecting the operator from electrical contact with any metallic parts that might be "alive," and as many as four units may be mounted in one enclosure. The units provide both normally open and closed circuits. Either momentary-contact units or a combination of momentary-contact and latched-in units are available. General Electric Co.

Centrifugal Washer

THE machine pictured is a sturdy forty-inch diameter, bottom discharge, suspended centrifugal popular in the chemical industry. One of the prime uses for this type of machine is for the classification of liquids containing solids and for the dehydration of crystalline materials. It also finds use in washing small molded and cut rubber articles, bulbs, balls, nipples, and other similar rubber products that require cleaning to present an attractive sales appearance. Rochester Engineering & Centrifugal Corp.



Suspended Centrifugal

New Goods and Specialties

New Intravenous Tubing

THE preservation and administration of serums and injectational medicants has an ever-growing dependence on biological rubber articles. Such vital importance attends the use of these articles that the same exacting care is required in perfection of design, the biological chemical requirements, and the care of manufacturing operations that exists with the preparation of the medicants themselves.

The Davol Rubber Co., Providence, R. I., for many years an important factor in the manufacture of this line, announces important developments in the production of intravenous tubing. A new process of manufacture is used whereby perfect smoothness of surface is assured; also a rubber compound has been introduced which, when cured by a positively controlled method, gives a non-free sulphur yielding product that meets all other biological requirements as well.

This tubing requires but little sterilization effort as compared with former types, and its perfect smoothness reduces to an absolute minimum the possibility of gathering harmful bacteria or contamination on either the inner or outer walls.

Unique Triangular Pillow

THE pillow illustrated claims many uses. With it six positions are possible. Three unequal angles with three unequal sides produce six separate positions as the pillow is designed firmly to support back, shoulders, or head. The drawstring serves to adjust the pillow to the hardness or softness desired and also aids in holding the pillow in shape.

It is filled with kapok, and the covering, in smart new colors, is DuPont "Doe-Tex," a rubberized fabric with suedelike appearance. Waterproof covers can be had for outdoor use of the



Six-Way Pillow

pillow, which because of its novel construction is said to have been utilized in emergencies on the water as a very satisfactory life-preserver. Barcalo Mfg. Co.

Electrician's Gloves

ONE of the latest special-type electrician's gloves is the F. E. Barns new reenforced model with laminated cuff. These gloves come in yellow with black center layer or in all black (both steam cured), with either straight or curved fingers in all standard voltages and sizes. The laminated construction gives added dielectric and tensile strength, and the black center layer shows at a glance how deep a tear, scratch, abrasion, or snag may be so that positive and accurate inspection can be made at once. This permits determination of how serious or dangerous any abrasion is and hence affords greater protection and increased confidence to the lineman. These gloves are patented and sold by The Frank E. Barns Co., 130 N. Wells St., Chicago, Ill., the head of which firm has for thirty-five years specialized in rubber gloves for various uses and is considered by many an authority on gloves, from a lifetime spent as designer, maker, and distributor. Widely known also are his surgical and acid-handler types.

Liquid Shut-Off Valve

PINCH valves for the control of liquid flow through rubber tubing have the well-known disadvantages of difficult operation, no gradation of flow, injury to the tubing, and unsightliness. A recent invention that permits of inserting directly into the tubing line is of neat appearance; the hard rubber exterior of which can be made of colors to harmonize with the article with which it is to be assembled. It is of durable construction, will give a positive seal against leakage, and permits of graduated flow from full capacity of the tube down to drop at a time.

The composition and operation of this patented valve will be understood by the following description and reference to the accompanying illustration: *A*, valve housing, hard rubber; *B*, valve housing cap, hard rubber; *C*, valve stem, hard rubber; *D*, operating handle, metal; *E*, flexible sleeve, soft rubber; *F*, valve spring, metal; *G*, valve head, hard rubber; *H*, valve seat, soft rubber; *I*, hold open spring lock, metal.

The parts, *A*, *B*, *C*, and *G* are molded from a plastic material such as rubber; *D*, *F*, and *I* are made of metal protected against moisture; while *E* and *H* are of soft elastic rubber. Depressing the handle *D* raises the (assembly *C*, *G*, *E*, and *F*) valve head *G* from the valve seat *H*, allowing liquid to flow through the stem *C* and through the ports in *G* out through the open valve. The sleeve *E* is securely fastened to the cap *B* and the valve head *G* to prevent leakage. A gasket is inserted between the cap *B* and the housing *A* for the same purpose. As the stem *C* rises to the position of maximum flow, a spring cam lock operates automatically to hold it in that position. This lock *I* is released manually to close the valve. Another model is designed for side flow.

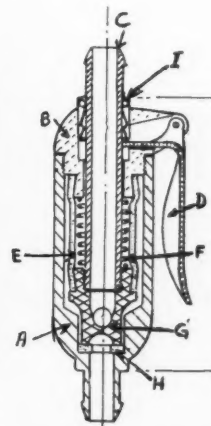


Sheep, Goats, and Tires Contribute to Assyrian Footgear

Assyrians Are Content with Home-Made Shoes Constructed from the Wool and Hair of Their Sheep and Goats and Sections of Automobile Tire Casings for Soles. The Feet of the Peasant, in the Illustration, Are Shod with Parts of a Discarded General Truck Tire. (Photo by Wide World Photos, Inc.)



New Barns Electrician's Glove



Gibbs Tubing Valve

Editor's Book Table

BOOK REVIEWS

"Latex in Industry." Royce J. Noble, Ph.D. *The Rubber Age*, 250 W. 57th St., New York, N. Y., 1936. Cloth, 384 pages, 6 by 9 inches. Illustrated. Indexed. Price \$7.

This treatise, the first of its kind, presents in authoritative, concise, and practical fashion the latest technical developments in production, handling, testing, and processing latex for its many industrial applications. The work is divided in two parts. Part I in ten chapters discusses latex as indicated by the following chapter headings: (1) Sources, Preservation and Shipment of Latex; (2) Properties of Latex; (3) Concentration of Latex; (4) Artificial Latexes; (5) Vulcanized Latex; (6) Compounding—General Materials; (7) Compounding—Stabilizers, Thickening, Wetting Agents, Equipment; (8) Coagulation of Latex Compositions; (9) Vulcanization; (10) Examination of Latex. Part II deals with methods of latex technology in fourteen chapters, as follows: (11) The Technical Applications of Latex; (12) Impregnation; (13) Spreading; (14) Dipping Processes; (15) Molding (Casting); (16) Electrodeposition; (17) Paper and Latex; (18) Artificial Leather; (19) Rubber Thread; (20) Porous Rubber; (21) Friction Elements; (22) Adhesives; (23) Latex Treated Rugs and Plush; (24) Miscellaneous Uses.

Appended to each chapter is a classified and copious bibliography of the topics treated in each chapter. These systematic references to sources of information to be found in the literature of latex add greatly to the value of the book.

The volume closes with complete author and subject indices that facilitate reference to the information in the text.

Rubber technologists everywhere will readily agree with the distinguished Dr. E. A. Hauser, who in the introduction to this book says, "All of us who have taken sincere interest in latex development owe Dr. Noble thanks for his contribution, which, I hope, will find all the reception and circulation it deserves."

"The Chemistry of Synthetic Resins." Carleton Ellis. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y., 1935. Two volumes, 1626 pages. Profusely illustrated and indexed. Price \$19.50.

The unprecedented development of synthetic resins in the past twelve years calls forth "The Chemistry of Synthetic Resins." This work, virtually a second edition of the well-known "Synthetic Resins and Their Plastics" by the same

"Morris Machine Works Bulletin 157." Morris Machine Works, Baldwinsville, N. Y. This handy reference bulletin covers centrifugal pumps for virtually every purpose. In addition useful information and data are given for centrifugal pump users.

"The Truth about Restriction." By L. W. Holland. Published by Kelly & Walsh, Ltd., Raffles Place, Singapore. This booklet, a compilation of articles originally published in "The Planter," journal of the Incorporated Society of Planters, is of vital interest to the entire rubber industry. It intends to show the change required in the rubber industry if it is to proceed on a sound and profitable basis that will permit everyone to reap the greatest possible benefits. This booklet is obtainable directly from the publishers, also the American News Co., Varick St., New York, N. Y.

"Supplement to 'The Truth about Restriction.'" L. W. Holland, Asiatic Production. Kelly & Walsh, Ltd., Raffles Place, Singapore. 1935. 11 pages.

author, provides a complete text of this huge industry which has attained great commercial significance. The minor as well as the major developments in the field of synthetic resins have been brought up to date, and the major synthetic resins such as phenol-formaldehyde, urea-formaldehyde, phthalic glyceride, and vinyl resin types, etc., are thoroughly considered. Synthetic and modifications of rubber are given the space of about sixty pages. The many phases of organic chemistry of the subject and as far as possible the treatment of the material are dealt with from the standpoint of the chemist. Likewise the technology of synthetic resins has received liberal treatment which will be of extraordinary value to the student, research chemist, biologist, analyst, testing engineer, and the many manufacturers in that vast field of technical operations where the search for special materials of fabrication and construction is in progress.

The detailed descriptions are supplemented by a large number of references totaling probably 15,000. Citations to less common journals or periodicals in foreign languages as well as to patents are accompanied by references to abstracts in chemical publications in English. Thus with a minimum of effort it is possible to obtain additional information rapidly and conveniently.

"Neville Coal-Tar Solvents Including Standard Coke Oven Light Oil Distillates, Special Coal-Tar Naphthas, and Plasticizing Oils." The Neville Co., Pittsburgh, Pa. This booklet comprises detailed specifications of crude and refined solvents and plasticizing oils, with notes on their industrial applications. A valuable feature for easy reference is the tabular data on solubility, miscibility, relative evaporations, comparative solvency, specific gravity, and temperature conversion.

"The Commercialization of the Home Through Industrial Home Work." United States Department of Labor, Women's Bureau, Bulletin No. 135. United States Government Printing Office, Washington, D. C. Paper, 49 pages. Illustrated. Price 5¢.

"The Health and Safety of Women in Industry." By Harriet A. Byrne, United States Department of Labor, Women's Bureau, Bulletin No. 136. United States Government Printing Office, Washington, D. C., 1935. Paper, 23 pages. Price 5¢.

"The Suit at Law of Latin America." Division of Commercial Laws, Bureau of Foreign and Domestic Commerce, Washington, D. C. This 52-page bulletin describes the court system of Argentine and traces the course of different types of civil actions and proceedings in Argentine law.

"Index to Publications of the Division of Commercial Laws." Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., October, 1935. 20 pages.

"The Zinc Activator." The New Jersey Zinc Sales Co., 160 Front St., New York, N. Y. The December, 1935, issue of this informative publication deals largely with the photomicrographs of important pigments and fillers used in the rubber industry. It also contains useful information on the use of zinc pigments in latex, and on the adhesion of rubber to zinc alloy die castings.

"The Vanderbilt News." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The November-December issue completes five years of publication of this magazine devoted to the improvement of rubber compounding based on materials and research contributed for the advance of rubber technology by the R. T. Vanderbilt Co. The leading article of the current issue describes the laboratory methods employed for production testing. Also given are a half dozen reports on the technical value of Vanderbilt ingredients in specific rubber products and 8 up-to-date compounding suggestions.

Rubber Industry in America

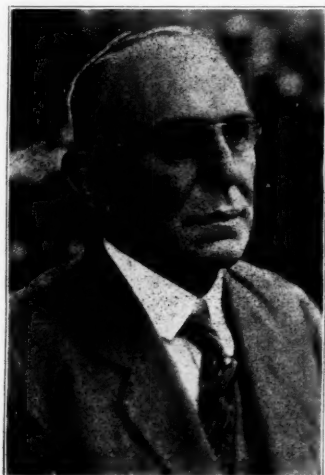
OBITUARY

W. J. B. Stokes

THE rubber industry as well as the city of Trenton lost a valued member when William J. B. Stokes, president of the Jos. Stokes Rubber Co., Trenton, died December 15. He had had several strokes in recent years and had been in a coma two days before the end came. Despite his physical disability, Mr. Stokes had been able to go to his office until a few weeks ago. His father, a pioneer of the rubber industry of Trenton, founded the company of which he was head.

William Stokes had also been associated with the Home Rubber Co. and the Trenton Rubber Mfg. Co., later the Thermoid Rubber Co., of which he had been treasurer and then president. At the time of his death he was a director of the Broad Street National Bank. Besides he had been a member of Wilson & Stokes, lumber merchant, and of the Trenton Sinking Fund Commission for many years as well as president of the Stacy-Trent Co., hotel operator.

Mr. Stokes was also quite active in the civic life of his city. He belonged to the common council of the Fourth Ward for six years and in 1894 was elected city treasurer. He was reelected in 1898 and 1904. He served as a trustee of the State Street Methodist Episcopal Church until his demise. During the World War he acted repeatedly as Mercer County Liberty Loan chairman and participated in all war drives in an official capacity. In memory of his daughter he built the Carolyn Stokes Day Nursery, which he always supported.



W. J. B. Stokes

The deceased was a thirty-third degree Mason, a member of Column Lodge, No. 120, and of the Scottish Rite and Mystic Shrine organizations.

Born August 22, 1857, at Pottsville, Pa., Mr. Stokes, when a child moved to Trenton with his parents. He went to State Model School and the Trenton Business College.

Surviving are his wife, two daughters, a son, a brother, Charles, head of the Home Rubber Co., two sisters, and nine grandchildren.

Funeral services were conducted December 18. Burial took place in Ewing Cemetery.

James Brotherton

JAMES BROTHERTON, 81, for more than fifty years with the United States Rubber Co., for which he was assistant manager of the glove branch in New York when he retired eleven years ago, died December 15. Funeral services were held December 17. He is survived by a sister.

John Evans

JOHN EVANS, who had worked for the Thermoid Rubber Co., Trenton, N. J., more than forty years prior to retiring eight years ago, died November 22 after a long illness. He was born in Harborton, N. J. He belonged to the Knights of Pythias and Sons of Civil War Veterans.

Mr. Evans is survived by his wife and a son.

Interment was in Ewing Cemetery, Trenton.

Henry H. Durr

ON DECEMBER 4, Henry Hubert Durr, former president of the Victor Rubber Co., Springfield, O., died of a heart ailment. He joined the rubber company in 1904 as its president. When it was reorganized in 1921 he was made secretary-treasurer and then president in 1925. At the concern's reorganization in 1932 as The Victor Rubber Corp., Mr. Durr was named sales manager and a director.

He was born in Camden, N. Y., January 29, 1865, and attended the local grade schools. In 1895 he became superintendent of street railways in Utica, N. Y. In 1900 he moved to Springfield.

Mr. Durr was a member of Springfield Country, Rotary, and Foreman's clubs and St. Teresa Church, all of Springfield.

A son, four daughters, and a sister survive him.



Wesley E. Wilson

Wesley E. Wilson

PNEUMONIA, coupled with injuries received in an automobile accident in which his wife was killed on October 24, led to the death, on December 14, of Wesley Elliot Wilson, who retired as president of The Akron Rubber Mold & Machine Co., Akron, O., in 1927. He joined the mold concern in 1914 as sales manager, later becoming also vice president and assistant general manager and finally president.

Mr. Wilson was born in Niles, O., in 1869. He attended grammar school. In 1892 he entered Betzler & Wilson Fountain Pen Co., of which he was made vice president and sales manager.

He was a Mason, Shriner, and Odd-fellow. His clubs included Akron City, Congress Lake, Portage Country, Old Colony, and Cleveland Yacht.

Funeral services were held December 18. Interment was in Rose Hill Cemetery.

Surviving are a son, three brothers, and a step-brother.

George Cameron Stone

GEORGE CAMERON STONE, former chief metallurgist for the New Jersey Zinc Co., 160 Front St., New York, N. Y., died November 18 after a brief illness. He first joined the company in 1882 as a chemist at its Newark plant and within two years was appointed general superintendent of the plant. In 1900 he was transferred to the company's New York offices as a chemical engineer. Some years later he was made chief metallurgist and held that position until he retired in 1929.

He was the holder of eight important

(Continued on page 64)

NEW ENGLAND

OPTIMISM prevails generally throughout the New England rubber trade. Conditions are improved over those of a year ago, with factories enjoying much better business. Moreover more enthusiasm exists over future conditions than at any time during the past five years.

Tire manufacturers, however, are experiencing a dull season. But footwear makers find sales greatly increased and present conditions good, with the outlook for the spring not yet determined as much depends on the weather.

The rubber industry, though, is buying very little machinery or equipment, a state of affairs that continued throughout 1935, and the same is expected for the new year.

The advancing of the date to introduce new models of automobiles was another favorable factor in this section of the country. Sales of cars also showed gains.

Manufacturers of raw materials other than rubber used in the industry expect a little improvement in early 1936 over 1935 because of a fairly strong trend toward rising prices for their products, necessitating a corresponding increase in their selling prices, which usually stimulates a little forward buying.

Sales of cotton goods are expanding although the cotton textile industry is still in an unsatisfactory condition. Leather shoe manufacturers are fairly busy; while the price of shoes has been raised.

United States Army shoe contracts for 1,000,000 pairs of rubber heels for CCC were awarded by Lieutenant-Colonel Luberoft, commanding officer of the Boston, Mass., quartermaster's depot. Firms receiving contracts were: Monarch Rubber Co., Baltimore, Md., 100,000 pairs at 6¢; Goodyear Tire & Rubber Co., Akron, O., 120,000 pairs at 7¢; B. F. Goodrich Co., Akron, 140,000 pairs at 7¢; Firestone Footwear Co., Boston, 250,000 pairs at 7¢; Barefoot Sole Co., Inc., Akron, 250,000 pairs at 7¢; Panther-Panco Rubber Co., Chelsea, 200,000 pairs at 7¢.

Davol Rubber Co. Ernest L. Kilcup, managing executive of the Davol Rubber Co., Providence, R. I., was elected a director for two years of the Providence Chamber of Commerce.

Nearly twenty persons on December 17 attended at the Narragansett Hotel, Providence, the annual Christmas banquet of Davol's Foremen's Association. John A. Kelly, chairman, introduced as the speakers Mr. Kilcup; Walter L. Davol, assistant managing executive; Frank Jackson, newly elected president of the association; George Fisher, new vice president; Owen E. Lowe, retiring president, who was presented a radio set; and R. J. Fries, Davol sales manager.

Rhode Island Rubber Club

The Rhode Island Rubber Club held its annual bowling tournament at the Washington Bowling Alleys, followed by a dinner and entertainment at the Narragansett Hotel, December 5. The affairs of the evening were attended by 147 members and guests.

The bowling contests began at 5 p.m., where inter-company teams and individuals matched their skill at duck pins, keeping thirty alleys busily engaged until 7:30 p.m., when all present assembled at the hotel for an excellent dinner. Following this came the entertainment features with L. D. Walker, Collier Insulated Wire Co., and president of the club, presiding. Prizes for the bowling contests were distributed by F. E. Rupert, Anaconda Wire & Cable Co., and secretary-treasurer of the club, as follows: first, second, third, and fourth prizes for high total three games were won respectively by Ray Newell, Respro, Inc.; Harry Thompson and Robert Armour, both of Anaconda Wire; and L. R. Nogene, Davol Rubber Co. The high single game winners were: first prize, Fred Fitzpatrick, Respro; second, Robert Buston, Anaconda Wire; and third, E. Connay, Appleton Rubber Co.

E. A. Hauser, associate professor of physical chemistry, Massachusetts Institute of Technology, lectured on his first-hand observations and studies of the Japanese social and economic situation, the growth in Japan of the rubber and the textile industries, and the world trade problem that is thereby presented to other industrial nations of the world. Then came Walter Grote, United Carbon Co., who clearly and carefully explained each of a great variety of amazing deceptions as he plied the necromantic skill for which he is noted.

Walter L. Tann, hydraulic engineer, Farrel-Birmingham Co., Inc., Ansonia, Conn., was the principal speaker at the December 5 meeting of the Engineers Club held at Stratfield Hotel, Bridgeport, Conn., when he discussed "Hydraulic Presses and Other Applications of Hydraulic Power."

The Goodyear Fabric Corp., tire fabric mill, New Bedford, Mass., recently adopted a three-shift schedule, forty hours a week for each shift, a maximum operation of 120 hours weekly. This increase in operations will add 250 employees at the mill, and as far as possible former workers will be taken on who were let go when the NRA reduced schedules to two shifts of forty hours each. Maximum production under the new schedule is expected to be maintained at least through January.

Garrison Engineering Corp. has moved from Waterbury, Conn., to Great Barrington, Mass.

MIDWEST

IN THE Midwest current business with rubber manufacturers is brisker than usual at this time of year. Manufacturers look forward to continued good business although this may be somewhat confused, and even retarded, by the political situation.

Automobile sales last month were said to be about 18% ahead of last year, with demand increasing. Automobile production in December seemed stabilized around the high figure of the latter half of November, in which month 375,000 units were produced. Heavy industries also are speeding up, and large chemical concerns are ahead of last year.

Paul O. Abbé, Inc., manufacturer of ball and pebble mills and mixers, Little Falls, N. J., has opened an office at 407 S. Dearborn St., Chicago, Ill.

L. F. Nickell, chairman and managing director of Monsanto Chemicals, Ltd., London, England, and a director of Monsanto Chemical Co., St. Louis, Mo., and of Monsanto (Canada), Ltd., Montreal, on November 22 addressed the Chicago Section, A. C. S., on aspects of the British chemical industry.

Freas Thermo-Electric Co., designing engineer and manufacturer, recently moved from Irvington, N. J., to 1736 N. Springfield Ave., Chicago, Ill.

The Bondall Co. recently purchased from the United States Rubber Co. the modern two-story building with 70,000 square feet of floor space the latter had formerly occupied at 500 Bittner St., North St. Louis, Mo., which is being altered and equipped to start operations about January 1. The Bondall Co. was recently formed to manufacture brake linings, clutch facings, molded rubber and asbestos material and will be the only firm in St. Louis specializing in making these products. Officers of the company include Charles A. Niemeyer, president; Carl Forline, vice president; George I. Parrish, treasurer; and F. W. Bitterman, secretary.

Van Cleef Bros., Chicago, Ill., manufacturer of "Dutch Brand" rubber and chemical products, again won the Rubber Section annual contest for the entire country, sponsored by the National Safety Council. This contest extended from January 1 to June 30, 1935, during which time Van Cleef employees attained a "no lost time accident" record. A plaque was awarded the firm at the Council's annual safety congress, Louisville, Ky.

Van Cleef appointed W. C. Floyd to have charge of sales on "Dutch Brand" products in North and South Carolina, Georgia, Florida, and Virginia. George Bills, who formerly covered this territory, will now devote his full time to Tennessee, Alabama, Mississippi, Kentucky, and parts of Indiana, Florida, and Illinois.

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OHIO

GAINS were recorded last month in the production of auto parts, tires, other rubber products, in building activity, electric power production, and various other industries in the Cleveland district. Rubber firms catering to the automotive industry enjoyed better business because of the advanced date in the showing of new models. Steel making reached a new high point for the year in December when one week the figure rose to 57%. Private employment also increased. The outlook for 1936 seems good.

Although the rubber industry in general has improved, certain divisions have cause for complaint. Rubber sundries, for instance, are not sharing in the increased volume of sales, but find conditions approximately the same as a year ago. The replacement tire business, although ahead of that in 1934, slowed up with the year-end. Notwithstanding the fact that business increased, manufacturers were compelled to sell at ridiculous figures and, naturally, thus their earning power was retarded. The future in this field seems not so good unless a substantial price rise occurs. Raw materials and labor have advanced in the past two years; yet tires are selling at the lowest figure in their history. If tire manufacturers expect to make any profit, they must advance prices or have the cost of raw materials and labor cut to much lower than at present.

Suppliers of fabrics to the rubber industry repeat the pessimistic story. Volume of business in 1935 was 15% greater than in 1934, and the figure for 1936 should grow, but profits are lower than in the corresponding period last year; while profits for 1936 look doubtful indeed.

The Akron Chamber of Commerce reported that the city's 1935 industrial payroll will exceed \$78,870,000, against \$71,100,480 in 1934. Employees in December totaled 51,405 compared with 50,613 a year ago.

The Cincinnati Rubber Mfg. Co., manufacturer of mechanical goods, Cincinnati, according to President J. F. Joseph, is erecting an extension, 80 by 50 feet, complete with craneway, to its building used for covering paper mill press rolls as well as other types of rolls and for tank lining. The extension is required to take care of expanding business.

United Rubberworkers of America. Following meetings addressed by Sherman Dalrymple, president of United Rubberworkers of America, applications for union charters were made by employees of The A. Buxbaum Co. and Seiberling Latex Products Co., both of Akron. Organization of office employees will be taken up soon.



Harlan L. Trumbull

Recently Elected

Recently elected vice chairman of the Rubber Division, A. C. S., was Harlan L. Trumbull, whose career in rubber chemistry has been marked with much success. At present he is manager of chemical research, The B. F. Goodrich Co., Akron, O., a position he has held since 1922.

Dr. Trumbull, who was born in Adair, Iowa, attended the University of Washington and received his bachelor of arts degree in 1907 and his M.A. the following year. The University of Chicago conferred a Ph.D. upon him in 1911.

Then until 1917 he served as an instructor at the University of Washington and during 1917-18 was a fellow at Mellon Institute. From 1918 to 1919 he was Captain Trumbull, of the Chemical Warfare Service, United States Army, at Edgewood Arsenal. In 1919 for a time he also acted as an expert on the War Trade Board in Washington. That same year he joined Goodrich.

Dr. Trumbull has taken out several chemical patents and has addressed many gatherings on the subject of rubber chemistry. His name, moreover, often is found among the contributors to technical and scientific journals. In 1933 he was selected by The National Research Council to prepare a survey on 1933 achievements in rubber chemistry for the Council's publication, "Annual Survey of American Chemistry." The results of his findings appear in the eighth and ninth editions of this work.

Harlan L. Trumbull has long been active in the Rubber Division of the American Chemical Society, having been a counselor, 1930-31, chairman of the Papers Committee, 1932-33, chairman of the Akron Section, 1934-35, and now is vice chairman of the Division.

He also belongs to Sigma Xi, Phi Lambda Upsilon, Gamma Alpha, F. & A. M., A. A. A. S., and American Institute of Chemical Engineers.

Dr. Trumbull lives in Hudson, O.

Cleveland Paint & Varnish Production Club recently was addressed by two men from Binney & Smith Co., 41 E. 42nd St., New York, N. Y. J. L. Venuto gave a thorough description of various types of blacks and their methods of manufacture. Following his talk a moving picture was shown of the entire process of manufacturing carbon blacks from the time the wells are drilled to the finished product, as well as warehousing and shipping of the material. K. E. Burgess showed a film in natural color covering the complete process of the manufacture of ferric and ferrous colors, manufactured by the Magnetic Pigment Co. division of Binney & Smith.

Eagle-Picher Lead Co., Cincinnati, recently appointed Earle W. McMullen director of research, succeeding Dr. John A. Schaeffer, who resigned to become president of Franklin and Marshall College. Mr. McMullen was formerly vice president and plant manager of Ault & Wiborg Corp., Cincinnati. Arthur S. Goltz retired as manager of the Buffalo, N. Y., office of Eagle-Picher Sales Co. and was succeeded by George Hanson of the Chicago staff.

Elgin Rubber Novelties, Inc., Cuyahoga Falls, manufactures specialty molded products and rubber novelties containing advertising. Company executives include L. F. Cook, who is president and treasurer, and E. F. Ast, vice president, secretary, and purchasing agent.

News Exchange, 29 So. Main St., Akron, has copies of INDIA RUBBER WORLD for local distribution.

The Cleveland Welding Co., Cleveland, through President H. W. Kranz has announced that through a stock purchase arrangement, controlling interest of the company has been returned to substantially the same Cleveland hands that held control prior to the company's affiliation some five years ago with Motor Wheel Corp., Lansing, Mich. The company has specialized in manufacturing circular products since 1911, including rims for automobiles, trucks and tractors, passenger car and truck wheels, steel bases for solid and industrial tires, electric motor frames, gear ring blanks, and circular parts of every description as used in washing machine manufacture, etc. The plant covering 21 acres of land, where more than 500 persons are employed, is at West 117th St. and Berea Road, Cleveland. The company also maintains an office in the General Motors Bldg., Detroit, Mich., under management of Dave R. Jones.

Goodrich Activities

Original tire equipment specification lists for 1936 passenger cars were recently published by The B. F. Goodrich Co., Akron. Careful study of sizes on the present list (see accompanying table) indicates that manufacturers are tending to use smaller rim diameters and that the range of tire cross-sections for passenger cars is becoming narrower. The number of current original

equipment sizes is thus far less than for many years.

Advertising Director P. C. Handerson has announced that E. D. Nathan, of the Goodrich advertising department, has been named assistant advertising manager of the Goodrich tire division. Mr. Nathan has been associated with Goodrich sales, export, and advertising departments since 1925. F. T. Tucker is Goodrich tire advertising manager.

S. M. Strong, formerly sales promotion manager in the company's New York district, has been transferred to Akron and assigned to the retail advertising division, Mr. Handerson also announced.

Goodrich's Silver Fleet is now in Florida for its winter program, with headquarters at Orlando. Traveling over 1,500,000 miles annually, the Silver Fleet goes South for the winter so that its operations in testing tires will not be interrupted by the uncertain weather conditions, often found in the North.

J. A. Hoban, manager of the Goodrich retail department, has announced that T. C. Yarnall, since 1929 manager of the Goodrich Silvertown Stores in Cedar Rapids, Iowa, was named on the staff of the retail department to assist in all phases of merchandising and retail promotional work.

Goodyear Tire & Rubber Co., Akron, according to reports current in the industry, was awarded a concession for the cultivation of 1,000 acres of rubber plantation in Costa Rica.

1936 Original Tire Equipment for American Automobiles

Name and Model	Wheel Base	Cyl.	Tire Size	Ply	Rim Size	*Valve
Auburn 654	120"	6	6.00-16	4	4.50E	R
852	127"	8	6.50-16	4	4.50E	R
Supercharged	127"	8	7.00-16	6	4.50E	R
Austin	75"	4	3.75-18	4	2.15E	1231
Buick 40	118"	8	6.50-16	4	4.50E	R
60	122"	8	7.00-15	4	5.00F	R
80	131"	8	7.00-16	4	5.00F	R
90	138"	8	7.50-16	4	5.00F	R
Cadillac 60	120"	V8	7.00-16	4	4.50E	R
70	131"	V8	7.50-16	4	5.00F	R
5P 75	138"	V8	7.50-16	4	5.00F	R
7P 75	138"	V8	7.50-16	6	5.00F	R
5P 80	131"	V12	7.50-16	6	5.00F	R
7P 80	138"	V12	7.50-16	6	5.00F	R
90	134"	V16	7.50-17	6	4.19F	R
Chevrolet Standard	109"	6	5.25-17	4	3.25E	R
Deluxe Master	113"	6	5.50-17	4	3.62F	R
Chrysler C-7 Airstream	118"	6	6.25-16	4	4.25E	R
C-8 Airstream	{ 121"-5P }	8	6.50-16	4	4.50E	R
	{ 136"-7P }					
C-9 Airflow	123"	8	7.00-16	4	5.00F	R
C-10 Airflow Imp.	128"	8	7.50-16	4	5.50F	R
C-11 Airflow Imp.	128"	8	7.50-16	4	5.50F	R
Cord	125"	V8	6.50-16W	6	4.50E	R
Cunningham V-9	142"	V8	7.00-20	6	5"FB	TR41
W-1	149"	V8	7.00-19	6	5"FB	TR41
De Soto S1 Airstream	117"	6	6.25-16	4	4.25E	R
S2 Airflow	117"	6	6.50-16	4	4.50E	R
Detroit Electric 97	117"	6	{ 33x4 1/2 }	6	4"FB	K
98	117"	6	{ 33x4 1/2 }	6	3.12FFB	TR 1
99	117"	6	{ 32x4 1/2 or }	4	4 1/2"FB	
			{ 34x4 1/2 }			
Dodge D2-5 Pass.	116"	6	6.00-16	4	3.12FFB	TR 1
D2-7 Pass.	128"	6	6.50-16	4	4.00E	R
Duesenberg JN	142 1/2"-153 1/2"	8	7.50-17	6	4.50E	R
Ford	112"	V8	6.00-16	4	4.19F	{ TR 7 or 7405 }
Graham 80	110 1/2"	6	5.25-17	4	4.00E	R
80	Opt.		{ 5.50-17 }	4	3.25E	R
90	115"	6	6.00-16	4	4.00E	R
Supercharger 110	115"	6	6.25-16	4	4.00E	R
Hudson 63	120"	6	6.00-16	4	4.00E	R
64	120"	8	6.25-16	4	4.00E	R
65	120"	8	6.25-16	4	4.00E	R
66	127"	8	6.25-16	4	4.00E	R
67	127"	8	6.25-16	4	4.00E	R
Hupmobile 618-G	118"	6	6.00-16	4	4.00E	R
621-N	121"	8	6.50-16	4	4.50E	R
Lafayette 3610	113"	6	6.00-16	4	4.25	R
LaSalle	120"	8	7.00-16	4	4.50E	R
Lincoln V-12	136"-145"	V12	7.50-17	6	5.00F	R
Zephyr	122"	V12	7.00-16	4	4.00E	R
Nash 3640	117"	6	6.00-16	4	4.25	R
3620	120"	6	6.25-16	4	4.25	R
3680	125"	8	6.50-16	4	4.50	R
Oldsmobile F-36	115"	6	6.50-16	4	4.50E	R
L-36	121"	8	7.00-16	4	4.50E	R
Packard 120	120"	8	7.00-16	4	4.50E	R
8-1400	127"	8	7.00-17	6	4.00F	TR 7
8-1401	134"	8	7.00-17	6	4.00F	TR 7
8-1402	139"	8	7.00-17	6	4.00F	TR 7
8-1403	132"	8	7.00-17	6	4.00F	TR 7
8-1404	139"	8	7.00-17	6	4.00F	TR 7
12-1407	139"	Twin 6	7.50-17	6	4.19F	TR 7
12-1408	144"	Twin 6	7.50-17	6	4.19F	TR 7
Pierce-Arrow No. 438	138"	8	7.00-17	6	4.19F	R
No. 444	144"	8	7.00-17	6	4.19F	R
No. 447	147"	8	7.50-17	6	4.19F	R
No. 538	138"	V12	7.50-17	6	4.19F	R
No. 544	144"	V12	7.50-17	6	4.19F	R
No. 747	147"	V12	7.50-17	6	4.19F	R
Plymouth Std. P1	113"	6	5.25-17	4	3.25E	R
DeLuxe P2	113"	6	6.00-16	4	4.00E	R
7 Pass. P2	128"	6	6.50-16	4	4.25E	R
Pontiac	112"	6	6.00-16	4	4.50E	R
"	116 1/2"	8	6.50-16	4	4.50E	R
Reo 6-D	115"	6	6.25-16	4	4.25E	R
Studebaker Dictator	116"	6	6.00-16	4	4.00E	R
"	116"	6	6.50-16	4	4.50E	R
President	125"	8	6.50-16	4	4.50E	R
"	125"	8	7.00-16	4	4.50E	R
Terraplane 61	116"	6	6.00-16	4	4.00E	R
62	116"	6	6.00-16	4	4.00E	R
Willys 77	100"	4	5.00-17	4	3.00	R
Commercial	100"	4	5.25-17	4	3.00	R

*Rubber valve.
Compiled by B. F. Goodrich Co.

Canadian Trade Agreement Effects on Rubber Goods¹

The Canadian rubber manufacturing industry is well developed, producing tires, rubber footwear, and mechanical rubber goods of all kinds, as well as many specialties, and exporting rubber products to world markets, particularly British Empire markets. The total annual value of production has declined in recent years, partly as a result of a severe decline in the exports. Imports of rubber goods have likewise declined in recent years. In 1934 both exports and imports increased in comparison with 1933, and while official figures are not available, the value of domestic production is known to have also increased. In major lines of rubber manufacture the Canadian rubber industry has a surplus capacity for production. The ownership and control over many of the important rubber manufacturing companies in Canada is in the hands of United States companies and individuals. The following summary statistics are from reports of the Dominion Bureau of Statistics, Ottawa.

CANADIAN RUBBER INDUSTRY STATISTICS

Year	—Thousands of Dollars—		
	Production	Exports	Imports
1927.....	\$91,414	\$28,001	\$5,361
1930.....	73,753	25,243	4,153
1933.....	41,512	7,644	1,799
1934.....	*	11,990	2,395

*Not available.

The United States has always supplied the bulk of Canadian imports of rubber manufactures. The United Kingdom has usually been second as a source of these imports. In very recent years the imports, particularly of rub-

(Continued on page 66)

¹Special Circular No. 3,593, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

EASTERN AND SOUTHERN

IN THE East business is reported much better; confidence seems more stabilized; and collections are considerably improved. Rubber goods manufacturers expect the first half of 1936 to produce even a larger volume of orders than did the corresponding period of 1935. A general price rise also is anticipated.

Especially good has been the trade lately of all makers of rubber products for the automobile industry. Substantial orders were received the last three months of 1935, and they are expected to continue the next two or three months, particularly orders originating in government offices.

Manufacturers of chemicals for the rubber industry have been enjoying a steadily increasing business, with conditions fairly satisfactory.

Throughout the nation the heavy industries continued to forge ahead. Steel production advanced; building schedules in many sections were double those of a year ago; and automobile sales surpassed earlier expectations. Employment in both manufacturing and trade continued to expand.

Greater employment was recently noted in New York State in automobile and automobile parts and brass and aluminum factories, in machinery and electrical plants, foundries, and machine shops, and in the chemical, oil, and paint industries.

Littlejohn & Co., Inc., commission merchant, has moved from 133 Front St. to 52 Wall St., New York, N. Y.

Lee Tire & Rubber Co., Conshohocken, Pa., as a result of the signing by Donald L. MacPhee, Oregon district manager, of his thirteenth contract in fourteen years for 7% of all tire requirements of the state of Oregon, will supply its tires for use in the state highway and state police departments, to all state institutions, including schools and colleges, and also to all divisions. Oregon usually uses about \$75,000 worth of tires a year.

Huber Announcements

J. M. Huber, Inc., manufacturer of carbon blacks, clays, and pigment colors, 460 W. 34th St., New York, N. Y., is installing another large natural gas-driven engine in its power plant at Borger, Tex. This is the sixth "Meriam-Rebuilt" engine Huber has purchased from The Meriam Co., 1955 W. 112th St., Cleveland, O., during the past four years.

Manager of Development Division

J. M. Huber, Inc., likewise has announced the appointment of C. A. Carlton, until recently chief chemist of the Seiberling Rubber Co., Barberton, O., to the position of manager of the Development Division, J. M. Huber Corp., with headquarters at Borger, Tex., where he will be occupied with research problems involving the manufacture and use of carbon blacks and clays.

Mr. Carlton's experience in the rubber industry began, while a student at the University of Akron, in June, 1916, when he worked for the Miller Rubber Co. After graduating with a B.S. degree in 1917 he went to the Republic Rubber Co., Youngstown, O., in charge of the research department and chemical laboratory. When the United States entered the World War, Mr. Carlton joined the Engineers Enlisted Reserve Corps and was stationed at the University of Akron as instructor, at the same time keeping books and procuring supplies for the tire repair training units maintained at the University. After the war Mr. Carlton was engaged by The Avalon Rubber Co., Barberton, as chief chemist and then by Kelly-Springfield Tire Co. in charge of organic research. Next for six years he was chief chemist at The Columbia Tire & Rubber Co., Mansfield, O., but in February, 1928, went to Seiberling in a similar capacity. Two years later he became development manager in charge of tire construction, design, specifications, and compounding for the Akron plant. Mr.



C. A. Carlton

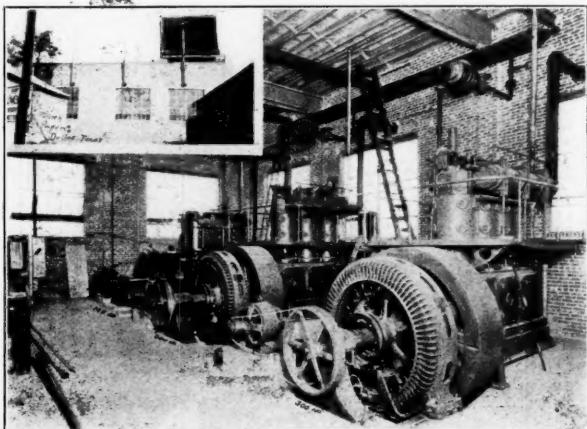
Carlton also had charge of all technical work for foreign plants including Seiberling Rubber Co. of Canada, Ltd., Toronto, Canada; Avon India Rubber Co., Melksham, Wiltshire, England; Bergougnan, Clermont-Ferrand, France; and Cia. Brasileira de Artefactos de Borracha, Rio, Brazil.

Mr. Carlton is a member of the Lambda Chi Alpha fraternity and the Masonic order.

William B. Bell, president of the American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., and of the Chemical Alliance, was named chairman of the finance committee of the National Republican Committee by Henry P. Fletcher, national chairman.

National Association of Manufacturers includes among its officers for 1936 the following vice presidents: F. B. Davis and N. W. Pickering, presidents, respectively, of United States Rubber Co., New York, N. Y., and Farrel-Birmingham Co., Inc., Ansonia, Conn.

American Standards Association, 29 W. 39th St., New York, N. Y., held its annual meeting at the Astor Hotel, December 11. J. C. Irwin reported on the greatly increased activities of the association during the past year in approving national standards that benefit industry. He stated that "the broadening of the safety code work in the field of public safety was one of the important developments during the year. Increased activity in developing standards for highway safety, and the appointment of a National Advisory Committee of leading experts in the field of occupational diseases to advise the several sectional committees working on specific problems of this kind, were two new developments which particularly indicated the scope and activity of the work in this field."



Power Plant
Interior
of the
Huber Plant
at
Borger, Tex.

Raymond Bill, chairman of the board and treasurer of Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y., publisher of INDIA RUBBER WORLD, was elected president of the National Conference of Business Paper Editors at the annual meeting at the Waldorf-Astoria, New York, December 2 to 3, 1935. In addition to his official connection with INDIA RUBBER WORLD, Mr. Bill is president and editor of the affiliate magazine, *Sales Management*; chairman of the committee on organization of the National Federation of Sales Executives; and a director and officer in a number of other organizations including the Trust Co. of Larchmont, N. Y.

Toy Manufacturers' Association will hold the American Toy Fair for 1936 at the Hotel McAlpin, New York, N. Y., from April 20 to May 2.

The Federal Trade Commission, Washington, D. C., recently issued a complaint against the International Latex Corp., Rochester, N. Y., charging unfair competition in the sale of products as bathing caps, pad shields, crib sheets, and tobacco pouches, which it advertised as "made of purest latex (not rubber)," whereas "in truth and in fact the products are composed of material consisting essentially of rubber hydrocarbon."

Counsel for the Commission recommended that the latter order the Goodyear Tire & Rubber Co., Akron, O., to "cease and desist" alleged violation of anti-trust laws through price discrimination. The Commission's brief traced the history of alleged price discrimination by Goodyear in sale of tires to Sears Roebuck & Co. The brief further said the company "has been given every opportunity to justify the wide discrimination between the prices at which it sells tires to Sears on the one hand and to independent dealers on the other hand. The Trial Examiner found in his report upon the facts that the discrimination could not be justified under the provisos of the statute."

U. S. Rubber Notes

Field Activities

The following promotions in the field organization of United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., have been announced: L. E. Peecher, formerly of the Denver office, appointed district manager of tire sales at Milwaukee; O. W. Hinterthur, advanced from assistant district manager at Boston to district manager of tire sales at Syracuse; P. M. Gregg, formerly of the Dallas office, made district manager of tire sales in Denver; T. E. Berry, assistant district manager at Los Angeles, to Mr. Gregg's post at Dallas.

U. S. Rubber Products footwear plant, Naugatuck, Conn., is building a new fireproof addition to its waterproof mill. It will be a basement and one story unit about 165 feet long by 45 feet wide, 15,000 square feet of floor space, at an approximate cost of \$30,000. This additional space will be used for the initial preparation of raw rubber and will improve rubber handling facilities and effect some operating economies, officials say.

Walter H. Norton, an official at the Naugatuck plant, has stated that the footwear division was so busy that only a one-day Christmas shutdown was possible. Besides overtime operations were necessary to maintain production schedules. Orders for bathing specialties were taken care of on regular schedule, but production of molded goods in the general products department was curtailed December 10.

J. A. Faucher was made manager of repair materials department, United States Rubber Products. Mr. Faucher, who will be located at headquarters at 1790 Broadway, will also be responsible for the company's policies and program relating to retreaded tires.

O. E. Hamer has become superintendent of the spinning division of Stark Mills, Hogansville, Ga., a division of Winnsboro Mills, Winnsboro, S. C., all U. S. Rubber units.

The petition of U. S. Rubber for the dissolution of the Revere Rubber Co., Providence, R. I., as a corporation, was granted in the Superior Court for Providence County on December 4 and a decree was ordered entered upon the filing of statement with the General Treasurer of Rhode Island.

Dr. A. E. Barnard, in charge of the Naugatuck Chemical latex development laboratory at Naugatuck, Conn., during the past several years, has recently been transferred to the New York office where his duties are concerned with the license and patent phases of sales promotion activities.

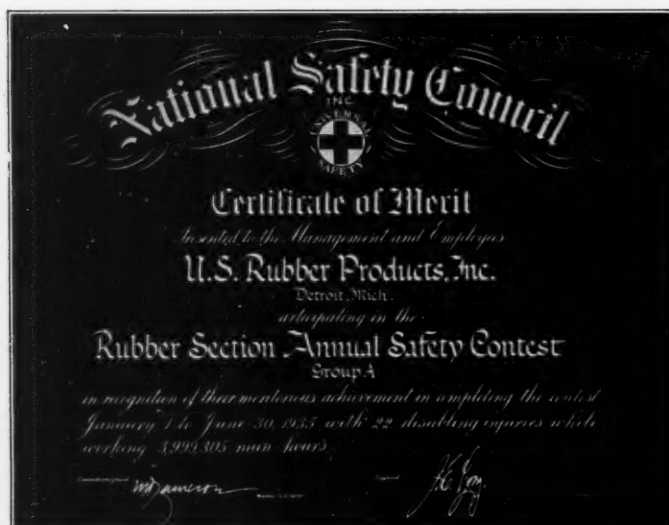
Safety Contest Awards

At the annual congress of the National Safety Council, Louisville, Ky., October 14-18, 1935, plants of the United States Rubber Co. received three of the five bronze trophies and three certificates of merit in the Council's National Safety Contest. These were awarded in connection with the Rubber Section Safety Contest held from January 1 to June 30, 1935. Thirty-six units were registered, representing a total of 67,768 persons who worked 60,000,000 man-hours. The average frequency rate for the 1935 contest was 6.291. (Note: Ratings for these contests are based on frequency rates only; namely, the number of lost-time accidents per million hours worked.) The combined frequency rate of all U. S. Rubber plants was lower than the frequency rate of the rubber industry as a whole.

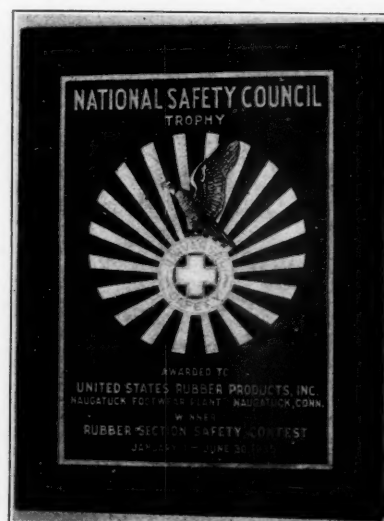
In Group A (plants working average monthly man-hours of 400,001 and over) Naugatuck Footwear plant received first prize, a bronze trophy, for 5,045,246 man-hours worked with nine lost-time accidents, a frequency rate of 1.784.

Ball Band plant at Mishawaka, second, received a certificate of merit, working 3,528,925 man-hours with 16 lost-time accidents, a frequency rate of 4.251.

The Detroit plant was third and also received a certificate of merit, for 22 lost-time accidents, during 3,999,305



Certificate
and
Plaque
among
Those
Won
by
U. S.
Rubber
Plants
in
National
Safety
Contest



man-hours, a frequency rate of 5.501.

In Group B (125,001 to 400,000 average monthly man-hour exposure) the Providence plant received a second-prize certificate of merit, 1,737,085 man-hours worked with two lost-time accidents, a frequency rate of 1.151.

In Group C and D (5,000 to 125,000 average monthly man-hour exposure) the first prize, a bronze trophy, went to the Samson Tire & Rubber Corp., Los Angeles, Calif., which operated 657,436 man-hours without a lost-time accident.

In the Machine Shop Division of the Metals Section Safety Contest, Shoe Hardware Division, Waterbury, Conn., received its trophy for a perfect score for the entire period of the contest.

U. S. Rubber's largest tire cord mill at Winnsboro, N. C., also had a perfect score. With an average of 1,450 employees it operated for 355 days, working approximately 2,000,000 man-hours without an injury of any kind.

Air Hygiene Foundation of America, Inc., recently was formed by a large group representing various industries, with headquarters at Thackeray Ave. and O'Hara St., Pittsburgh, Pa., to conduct investigations of and to stimulate research on problems in the field of air hygiene and to gather and disseminate factual information relating thereto. It will also cooperate with and assist other agencies active in this field and will collaborate in the coordination of such research efforts. A comprehensive investigation has been begun at Mellon Institute of Industrial Research, Pittsburgh, under support of Air Hygiene Foundation of America, in which the hygienic, technologic, and economic aspects of air contamination, especially by dust in the industries, will be studied.

H. B. Meller, a leading authority on air pollution, has been appointed managing director of the new organization, and will head the investigation at Mellon Institute. He will be aided by Dr. F. F. Rupert, specialist in the field of physical chemistry and of air pollutants and especially of dusts. Dr. Rupert has conducted a number of plant investigations, in which he has evaluated procedures for determining and controlling industrial dusts.

The investigational program of the Air Hygiene Foundation of America will also embrace medical considerations and studies. The medical adviser will be Dr. Samuel R. Haythorn, professor of preventive medicine in the School of Medicine of the University of Pittsburgh and director of the Singer Research Laboratories, N.S., Pittsburgh. Dr. Haythorn, who has distinguished himself by his researches in bacteriology and pathology, particularly on the effects of smoke and on the causes and nature of pulmonary diseases, is a member of the Advisory Board of the Pennsylvania State Department of Health, Pittsburgh Academy of Medicine (president, 1927), Society of Experimental Pathology (president, 1932), Society of Experimental

Biology, American Medical Association, and American College of Physicians. Prior to assuming his present chair in the School of Medicine of the University of Pittsburgh, he was professor of pathology and director of hygiene in that institution (1921-1926).

Chemical Exposition

The Fifteenth Biennial Exposition of Chemical Industries held at the Grand Central Palace, New York, N. Y., week ended December 7, 1935, afforded much of interest and instruction regarding the latest technical developments in materials and equipment to approximately 35,000 scientists and engineers attending from all parts of this continent as well as numerous representatives of industries in foreign countries.

Among the exhibits of interest to those in the rubber industry were chemical containers such as the all-rubber drum developed by The General Tire & Rubber Co., Akron, O., in cooperation with the American Cyanamid Corp., New York, and the rubber lined fiber drum of the Carpenter Container Co., Brooklyn, N. Y.; a vast line of Witco carbon blacks and chemicals by the Wishnick-Tumpeer, Inc., 295 Madison Ave., New York; laboratory and aging ovens by the Freas Thermo-Electric Co., Chicago, Ill.; internal mixers by Werner & Pfleiderer; rubber dust grinders by the Federal Pneumatic Systems, Inc.; and latex compounding equipment by the Beach-Russ Co., Chemicolloid Laboratories, Eppembach, Inc., Manton-Gaulin Mfg. Co., and the Premier Colloid Co.

Perhaps of greatest economic interest was the American Chemical Society exhibit which portrayed more than one hundred commercially important developments that have come into existence during the past two years. This display was very appropriately named the "Children of Recovery." Among these in connection with rubber were a line of organic wetting agents by Rubber Service Laboratories Co., Akron; Neo-Spectra, Hiblak, and Coblac special property blacks by Binney & Smith Co., 41 E. 42nd St., New York; Thiokol molding powder by the Thiokol Corp., Yardville, N. J.; and Tornesit, a chlorinated rubber and a new process zinc sulphide pigment by the Hercules Powder Co.

The Bronze Plaque, biennially awarded by *Chemical and Metallurgical Engineering* for the outstanding company chemical achievement since the last chemical exposition, was accepted by Edmund G. Robinson, manager of the Organic Chemicals Department, for the E. I. du Pont de Nemours & Co., Inc., 1935 winner. This was in response to the formal presentation by Albert E. Marshall, president, American Institute of Chemical Engineers, and chairman of the Committee of Award, at a dinner given at the University Club, New York, December 6. Sidney D. Kirkpatrick, editor of *Chemical and Metallurgical Engineering*, acted as toastmaster on this occasion.

B. Brittain Wilson, business manager of INDIA RUBBER WORLD, at a recent meeting of the board was elected a vice president and a director of Bill Bros. Publishing Corp., 420 Lexington Ave., New York, N. Y., publisher of INDIA RUBBER WORLD and several other business papers. Mr. Wilson joined the late Col. Edward Lyman Bill, father of the present chairman and president of the corporation, over thirty-five years ago as office boy and before being placed in charge of the business department of INDIA RUBBER WORLD in 1932 was for a number of years editor and later general manager of *The Music Trade Review* and also was associated for various periods with other publications in the Bill Bros. group.

I. B. Kleinert Rubber Co., College Point, L. I. Andrew Howard and George Weisbacher, with Kleinert for fifty years, were given a banquet December 14 in recognition of their long services.

The Thiokol Corp., Yardville, manufacturer of synthetic rubber, has appointed T. J. Maloney, Inc., 386 Fourth Ave., New York, N. Y., as advertising counsel.

Midwest

(Continued from page 56)

Hodgman Rubber Co., Framingham, Mass., moved its Chicago, Ill., office to 412 South Wells St. This office is in charge of J. B. Jann, Midwest sales representative for Hodgman, who reports that sales volume on the company's specialties during 1935 was greatly increased over that of 1934. With the improvement and additions in Hodgman sporting specialties for the 1936 season, Mr. Jann expects even better business for the new year, for which most firms entertain similar optimistic views.

Bowes Seal Fast Corp., Indianapolis, Ind., according to President Robert M. Bowes will open a plant in London, England, known as Bowes Seal Fast Corp. of Great Britain, Ltd., to be in operation this coming spring. Shares in the new concern will be held jointly by the Indiana organization and the Associated Component Manufacturers, Ltd., London, to which the American firm for years has been exporting its products for distribution throughout the British Empire. A. H. Phillips, of London, representing the English company, was in Indianapolis during December completing arrangements for the new enterprise, which will manufacture tire and tube repair equipment and materials and automotive chemical products. The Bowes company, said to be the largest manufacturer of tire and tube repair materials in the United States, is conducting an expansion program that adds to its line of products automobile lamps, spark plugs, and similar automotive goods. The firm has also been operating a plant at Hamilton, Ont., Canada, for the past several years.

NEW JERSEY

LITTLE change occurred in the rubber industry in New Jersey last month. Some firms continue to operate at full capacity; while others report declining business. Production of drug-gists' sundries and rubber cloth has dropped. Chemicals are enjoying decidedly improved business. Makers of machinery for the rubber industry, however, are receiving very few orders or inquiries for such equipment.

In general 1935 trade has been reasonably good. The outlook for 1936 is uncertain, but manufacturers believe business will continue at approximately the same pace throughout the winter. But labor disturbances are expected in rubber, iron, and steel industries.

Acme Rubber Mfg. Co., Trenton, found October its best month for the past year, but November showed a little decline. An official said business increased about 15% over the 1934 figure.

Jos. Stokes Rubber Co., Trenton, reports business continues good at both the Trenton and Canadian plants.

Pierce-Roberts Rubber Co., Trenton, since business dropped off, now operates with but one shift. The company had been very busy all summer.

Mercer Rubber Co., Hamilton Square, calls business favorable, with production far ahead of last year.

Puritan Rubber Co., Trenton, is running twenty-four hours a day in some departments and employing two shifts in others. The company has let a contract for the erection of a one-story warehouse.

Whitehead Bros. Rubber Co., Trenton, maintaining three shifts, has enough orders to keep the plant running full handed for some time.

The Pocono Co., Trenton, announces that business has dropped off, but is expected to pick up again after the new year, as the company has good prospects for the late winter months.

Lambertville Rubber Co., Lambertville, differences have been adjusted, and all departments are now in operation again. Dissatisfaction existed among employees of the making and finishing departments over a bonus, and they refused to work. The strikers later concluded they had been dealt with fairly and returned to their jobs. The trouble started when the company announced a \$1,000 bonus distribution among departments which showed progress during the year. The company is very busy and expects to run at full capacity for some time to fill orders for boots and rubbers for the winter trade.

The U. S. Rubber Specialty Co., Trenton, is marketing a new bath combination including fountain sponge, hand sponge, all-rubber bath shower, and shampoo and massage spray.

Murray Rubber Sale

The plant and assets of the Murray Rubber Co., Trenton, December 6 went to Max Kalter, of New York, N. Y., for \$340,000 under a sale conducted in the United States District Court by Federal Judge Philip Forman. A bid of \$300,000 by C. H. Greyer, of Trenton, was withdrawn after counsel for creditors charged he was acting as a "straw man" for other officials. Counsel for plant receivers denied the charge, which was discredited also by Judge Forman.

The Third National Bank, Scranton, Pa., holds a \$700,000 claim against the Murray company; while the National Bank of Kentucky holds a claim for \$800,000. The Banco Kentucky Co., Louisville, has a claim of \$585,000. Murray Rubber Co., one of the oldest rubber concerns in New Jersey, was formerly the Empire Tire & Rubber Co. General C. Edward Murray, Sr., president of the Crescent Insulated Wire & Cable Co., was president of the former concern for many years. Later his son, C. Edward Murray, Jr., took over the plant and conducted it until a few years ago. Some time ago the company quit the manufacture of mechanical goods and now makes tires and tubes. The disposition of the plant has not been decided upon. Alfred H. Brenham, of Louisville, Ky., was receiver of the concern.

Thermoid Co.

Thermoid Co., Trenton, according to President F. E. Schluter, has acquired the Triplewear Brake Lining Corp., formerly the Durwyllan Co., Paterson. Besides making molded brake lining Triplewear has developed a unique process of rubber thread manufacture on which patents have been applied for. The rubber is vulcanized, formed, and turned out in finished threads all in one process where heretofore many operations were required. Norman Heil, president of Triplewear, and William Heil, secretary and factory manager, as well as junior executives will affiliate with Thermoid. J. O. Camp, sales manager of Triplewear, will continue the management of the company's sales.

All Triplewear brake lining accounts will be assured by both companies that they may continue to purchase Triplewear brake lining and other Triplewear products as long as they desire. Clutch facings have been recently added to the line.

Thermoid also announced the termination of the services of Lloyd Leaver, vice president in charge of sales of the mechanical rubber goods division. Fred Matheis, for many years in active charge of the department routine, was elected assistant vice president and will continue to manage the office of the division. S. H. Lyons, dean of the

mechanicals sales division, was appointed eastern manager of the department.

The additional equipment and machinery purchased during 1935 to take care of increased business and the manufacture of new products will be installed completely by January 1.

Sales of mechanicals so far this year have been over 25% in excess of those for 1934.

When making this announcement, President Schluter said: "I have every reason to believe we will enjoy even greater sales next year."

Essex Rubber Co., Trenton, reports that business has been better during the past three months than during the same time last year and that the outlook is very good for 1936. Lawrence M. Oakley, an official of the company, was on a business trip through New England, where the firm's sales have increased.

Rubber Displays, Inc., Trenton, has acquired the services of Homer B. Hoffman, industrial engineer, in connection with the supervision of its increasing production, according to Mitchell Carter, vice president and general manager of the company.

FINANCIAL Company Reports

Akron Rubber Reclaiming Co., Barberton, O. Year ended October 31: net loss, \$69,473.

The Firestone Tire & Rubber Co., Akron, O. Year ended October 31: net sales of \$121,670,572, an increase of 22% over the preceding fiscal year; net profit of \$5,649,146 after interest, depreciation, federal taxes, and other charges. After dividend requirements on series A, 6% cumulative preferred stock, the profit was equal to \$1.53 a share on 1,866,007 shares of \$10-par common stock. In the preceding year the net profit, after similar deductions, was \$4,154,655, or 71¢ a share on 1,897,594 common shares. Current assets on October 31, including \$11,613,287 cash, were \$66,743,787, and current liabilities, \$19,610,234. This compares with \$10,614,594 cash, current assets of \$62,087,150 and current liabilities of \$14,302,315 at the close of the company's 1934 fiscal year. Inventories were \$35,995,720, against \$36,326,223.

National Rubber Machinery Co., Akron, O. Six months ended June 30: net income after depreciation, federal taxes, interest, and other charges, \$26,536. Last July and August net loss was \$50,821 after charges.

The Board of Governors of the New York Curb Exchange recently approved

(Continued on page 64)

¹ "Dividends Declared" on p. 84.

Rubber Industry in Europe

Russia

The large-scale work on synthetic rubber in Russia is of particular interest to other countries, especially at this time of uncertain world conditions and threats of war. Relegating considerations of costs to a secondary position, the Russians have concentrated on their chief object, to produce on a commercial scale suitable materials to take the place of rubber. To Russia, with its comparatively poorly developed railway systems, vast distances, and very small coast line, motor transportation is of prime importance; the country must be able to produce large quantities of synthetic rubber, which must be good enough for sturdy, resistant tires that will stand up well under the frequently trying road conditions.

At present four types of synthetic rubber are being worked with: first, the two kinds of butadiene rubber, the one an ethyl alcohol rubber, and the other, still in an experimental stage, produced from a petroleum base; then Sovprene, which closely resembles "DuPrene;"¹ and finally the product heralded as Resinit, but which, it now develops, is Thiokol.

The greatest progress seems to have been made with the first type of butadiene rubber. As early as 1933 tires made from it were subjected to a severe test when a number of trucks equipped with these and also natural rubber tires ran a stretch of almost 10,000 kilometers through desert under the worst possible conditions. The synthetic tires made a poorer showing than those of natural rubber, chiefly because of faulty tire construction and the poor adhesion qualities of the material. But the abrasion qualities of the former proved to be superior to those of natural rubber tires; thus while the loss from wear per 1,000 kilometers was 90 grams for natural rubber tires, it was 65 to 70 kilograms for the synthetic.

In an article on Russian synthetic rubber, in *Gummi-Zeitung*, Dr. Paul Ruprecht gives interesting data regarding the gradual improvement in yield and costs. At first, he says, this rubber cost twenty-five to thirty times as much as natural rubber; then grain alcohol was used in the process. At present alcohol from potatoes is being used, but even so, it represents only 11% of the total alcohol produced. Alcohol from potatoes costs less than one-fourth the price of grain alcohol; and with increased production the price would fall lower. At the same time the technique of synthetic rubber production has also greatly improved so that whereas at first only 4% of rubber was obtained from a ton of alcohol, now 23% is the

yield; and it is hoped soon to increase this figure to 33%, with naturally a further drop in the cost.

Sovprene is said to be cheaper and easier to produce than the butadiene rubbers, but its odor is a great drawback. A factory to produce 10,000 tons of Sovprene is in construction near the Turkish border.

Last year the synthetic rubber factories produced 11,300 tons of synthetic rubber, apparently mainly butadiene rubber, of which 8,000 tons were for the automobile industry. The program for 1935 called for 20,000 tons of synthetic rubber, but since these were already produced in the first ten months of the year, the total will probably be about 25,000 tons. For 1936 the quota is 40,000 tons. It appears likely this will be achieved, for there are now three synthetic rubber factories operating, and the fourth, in Kazan, will soon be in production.

Meanwhile official reports show that Russian imports of crude rubber for the first time since 1930 have fallen off considerably, allegedly as a result of the increased home production of synthetic rubber. In the first eight months of 1935 imports were 21,700 tons, against 28,607 tons in the corresponding period of 1934.

New developments are also taking place in other directions. More reclaim plants are being built; a factory in Kazan for manufacturing leather substitute will start operations in the spring, with production of 6,000 tons. A factory for artificial rubber soles is also being built at Kalinin.

Germany

In line with its aim to advance the motorization of Germany, the present government two years ago reorganized automotive research work. A special Research Council for the Automotive System was formed to which belong representatives of the motor vehicle industry, of the fourteen scientific research institutes for motor vehicles at the various technical institutes and universities, and of the big consumers. On the basis of suggestions from these three bodies, the council sets up a research plan for each year, which is then put before the individual research institutes. For the current business year various problems in connection with tires will be considered. Tests will be carried out on the efficiency of pneumatic and solid tires; studies will be made of the adhesion power of rubber tires, the heat resistance of tire compounds, the decrease in the development of heat in the mix, and the increase in the heat conductivity of the

rubber; also of the rolling resistance of tires at high speeds on different surfaces, the relation of the rolling resistance to speed, etc.

During the first nine months of 1935, Germany imported 474,988 quintals of rubber, value 32,302,000 marks, against 517,292 quintals, value 31,907,000 marks, in the same period of 1934. Since at the same time reexports were 10,207 quintals, value 671,000 marks, against 24,003 quintals, value 1,507,000 marks, the total amount of rubber retained was 464,781 quintals, value 31,631,000 marks, against 493,289 quintals, value 30,400,000 marks. Exports of rubber manufactures, increasing in quantity if not in value, came to 104,789 quintals, value 29,523,000 marks, against 95,470 quintals, value 30,493,000 marks. The spurt in the export of tires is of particular interest; cycle tires increased 157%, and automobile tires around 200% as compared with figures for the preceding year. Germany's best customer for cycle tires was Brazil, and for automobile tires, Holland, the latter taking exactly half of the total.

The Forest Department of Bavaria has been active in introducing pneumatic tires for wagons for carting wood, even until recently granting subsidies for the acquisition of these tires, and now they are to be found in every government district here. The advantages of the pneumatic tires are widely recognized, and there seems to be universal satisfaction over the greater loads possible with pneumatic tires; while at the same time drawing is easier for the animals, over the ease of loading and handling the wagons, the greater adhesion and safety of the rubber tires even on ice-covered roads, and the saving of the road surface.

Great Britain

A new method for attaching rubber heels and soles to leather or fabric uppers was discussed by S. K. Hodgkins at a meeting of the Leicester National Association of Shoe Trade Managers and Foremen. For soling is used an uncured rubber dough, put out in sheets and obtainable in different qualities. The leather shoe to be soled is lasted and roughed on the lasting margin; next a special rubber solution is brushed over the roughened surface. The shaped heel and then the sole of dough are placed in a mold which is heated, and the shoe is placed in position in the mold. Pressure is applied, and in ten minutes the shoe is ready. The main difficulty hitherto met with in attempts at processes of this kind, the damaging of the leather upper by the heat of curing, is overcome be-

¹ Trade mark registered.

cause in this machine heat can be effectively controlled. The adhesion is said to be perfect on both leather and canvas shoes, and the soles give as good wear as do any others of carbon rubber compound. Incidentally, the shoes can be repaired. The process is intended for lower-priced shoes, the potential market in England being put at around 12,000,000 pairs annually. The daily output of a machine is estimated at 3,000 to 3,500 pairs.

Imperial Chemical Industries, Ltd., has announced a new blue pigment, Monastral Fast Blue B.S., said to be of greater all-round fastness and brilliance of shade than any used hitherto. The new pigment, it is claimed, definitely fills the last remaining gap in the series of insoluble pigment organic dyestuffs. Blue has always been the least satisfactory color in the whole spectrum range of insoluble pigments of the organic type; in fact the most widely used and the most important blues have so far been Prussian blue and Ultramarine, both pigments of inorganic type. For the new blue is claimed exceptional fastness to light, acids, alkalis, and lime, besides extreme brilliance of shade and high tinctorial value. The range of its potential uses is indicated by the fact that it will withstand temperatures up to 390° F. and is completely insoluble in oil, spirits, and nitro-cellulose solvents. As a rubber pigment, it gives excellent shades in all rubber processes and under all conditions of cure. It also seems ideal for plastic compositions as it resists, without change, the highest molding temperatures as well as the effect of formaldehyde and different catalysts.

The Principality Wagon Co., Ltd., Cardiff, has devised a movable floor under geared control for simplifying loading and unloading trucks, etc. The floor belt, of rubber and cotton duck, is clamped to two main rollers; while the three tiers of main rollers over which it is placed make for smooth and easy running. At the rear and front ends suitable totally enclosed reduction gears are fitted. With this device up to ten tons can be unloaded single-handed in less than two minutes. Smaller loads, three to four tons, can be completely cleared in a few seconds without the necessity of moving the vehicle. It is claimed that as the floor is flexible and friction is eliminated, wear is practically negligible.

Other European Notes

Turkey is now also interested in manufacturing gas masks. Recently a factory capable of producing 100,000 masks a year on one eight-hour shift daily, was opened at Mamak.

The Suomen Gummitehdas O/Y., or the Finnish Rubber Factory, produces about 1,200,000 pairs of galoshes, 600,000 pairs of sports shoes, 800,000 pairs of overshoes, and 200,000 pairs of rubber-soled canvas shoes annually. The director of the concern, Mr. Wester-

lund, states that while the firm has so far been able to increase sales, serious competition is now being offered by Japan and Czechoslovakia, which are dumping footwear now in Finland also. The firm's business in cycle tires has improved considerably; while the manufacture of automobile tires has outgrown the experimental stage, and increasing sales can be reported. It is planned to expand the field of production to include technical goods as belting, hose, packing roller covers, etc.

A. G. N. Swart, rubber trader, recently moved from 62 Rue Blanche to 7 Avenue de l'Opéra, Paris, France.

OBITUARY

(Continued from page 55)

metallurgical patents, among which included two for the manufacture of sulphuric acid, two patents on lead and zinc extraction from ores; one for the metal flotation apparatus; two for gas filtration. In February, 1935, he received the James Gold Medal at the annual meeting of the American Institute of Mining and Metallurgical Engineers "for distinguished achievements in non-ferrous metallurgy."

Mr. Stone was a graduate of the Columbia University School of Mines and a member of the Century Association and the Chemists Club. He is survived by a brother, a nephew, and a niece.

Charles W. Sloan

A HEART ailment caused the death, on November 23, of Charles W. Sloan, former part owner and general manager of the Mercer Rubber Co., Hamilton Square, N. J. Mr. Sloan and the late John Clancy were partners in the Mercer company for many years until the former sold his interests to Sayen & Austin, of Philadelphia, Pa. At one time Mr. Sloan had been employed by the Goodyear Rubber Co., Akron, O., as manager of its mills.

The deceased was born in Flemington, N. J., eighty-eight years ago. He graduated from Princeton University in 1867.

Surviving are two nephews and two nieces.

Burial was in Flemington.

Edward H. Huxley

ON DECEMBER 11 Edward H. Huxley, for many years president of the United States Rubber Export Co., Ltd., died at his home in Tenafly, N. J. He had long been identified with the rubber industry. At one time he worked for the Boston Woven Hose & Rubber Co., Cambridge, Mass. Then in 1911 he became assistant general manager and sales agent of the National India Rubber Co., Bristol, R. I. Later he came to New York for the United States Rubber Co. and devoted himself to the export field. When, in November, 1914, the company formed the United States Rubber Export Co., Ltd., to concentrate all its export business, Mr. Huxley was elected president, a position

he held about fifteen years. He was also active in the Rubber Association of America, particularly in the foreign trade division.

The deceased was born in Newton, Mass., sixty-two years ago.

He was buried in Mount Auburn Cemetery, Cambridge, Mass., December 13.

He leaves his wife and a son.

William P. Grant

WILLIAM P. GRANT, for several years superintendent of the Phillips Insulated Wire Co., at Phillipsdale, R. I., from which he had retired six years ago, died at his home in Pawtucket, December 4 after a long illness. He was born in North Bellington, Mass., fifty-three years ago. He was a member of E. L. Freeman Lodge, Pawtucket Royal Arch Chapter of Masons, and the Park Place Congregational Church. He is survived by his wife and two daughters.

Winfield S. Knowles

WINFIELD S. KNOWLES, president of Globe Rubber Works, Inc., 45 High St., Boston, died December 19. His obituary will appear next month.

FINANCIAL

(Continued from page 62)

listing application of National Rubber Machinery Co. to add 25,000 shares of common stock.

Norwalk Tire & Rubber Co., Norwalk, Conn. Year ended September 30: net loss after depreciation, taxes, and other charges, \$49,918, contrasted with a net profit of \$11,324, equal to \$1.23 a share on 9,184 shares of \$50 par 7% preferred stock in the preceding year.

United Shoe Machinery Corp., Boston, Mass., declared a special dividend of \$2 and the regular quarterly dividend of 62½¢ on the common stock, payable January 6 to stockholders as of December 17. A year ago a special dividend of \$2 was paid.

Argentina

Statistics from the Argentine Bureau of Commerce and Industry show domestic tire production during 1934 totaled 435,610 units, an increase of 183,785 units over the 1933 figure; 1934 output of inner tubes amounted to 688,786 units, an increase of 309,471 over 1933. The capital invested in the industry in 1934 was 28,248,211 paper pesos, an increase of 4,673,911 pesos as compared with 1933.

Argentine import figures covering tires and tubes show that domestic production is gradually curtailing imports of these items. Arrivals of tires decreased from 1,828,115 kilos in 1933 to 1,590,512 kilos in 1934; while imports of tubes dropped from 177,890 to 123,184 kilos. During the first half of 1935 Argentine tire imports amounted to only 444,950 kilos; while receipts of inner tubes declined to 26,227 kilos.

Rubber Industry in Far East

NETHERLAND INDIA

A.V.R.O.S. Report

The report of the Algemeen Proefstation of the A.V.R.O.S. (Sumatra) for July 1, 1934, to June 30, 1935, states that during the year under review several estates reported unusually severe cases of die-back in buddings of about five to eight years. Both the young and older branches were attacked, and in some instances the entire trunk died. The reporting estates are widely scattered with different types of soil on both high and low-lying lands. In general the disease was preceded by severe attacks by mites which caused the trees to be practically denuded of all foliage for months. The die-back started in the young branches and then spread rapidly. When once the trunk was reached, the whole stem was soon affected and sometimes died down to the foot in a few days. Cultures taken from the dead branches always revealed the presence of the fungus *Botryodiplodia Theobromae*. It is thought that the young buddings were so exhausted by the mite attacks that the fungus was able to get in its deadly work. It was found that by lopping off the diseased parts 25 to 30 cm. below the infection the spread of the disease could be checked. What havoc it may cause is evident from the fact that on a single estate 2,500 trees had to be treated in this way. As the disease seems to be closely connected with weather conditions, it appears that very little can be done at present to prevent it.

Prolonged and severe attacks by mites were also reported in older buddings where they caused considerable loss of foliage and, still worse, of crop. It was attempted to combat the plague by means of sulphur dusting, and an area of 92 hectares was sprayed seven times, but without any effect. Certain clones seem far less susceptible than others; thus clone 163 suffered very little.

In an earlier report mention was made of an as yet unknown disease which caused die-back of the untapped bark of individuals of clone A.V. 50 on a certain estate. This year the disease appeared again, but on a different estate when members of the same clone were affected.

Following the regular plan, a questionnaire was again sent to estates for data on methods of preparing rubber. Figures returned by 199 estates in Sumatra reveal a little over 21% of the total rubber prepared in the usual way consisted of No. 1 crepe, and over 50% of sheet. The output of thin sheet was 33% of the total sheet against 20% the

year before. A small amount of air-dried sheet was also reported. The sprayed rubber output represented almost 8,000,000 kilos of dry rubber.

Most estates used formic acid as coagulant; eleven still clung to acetic acid; one used sodium silicofluoride, and twenty-one a mixture of the latter and formic acid. The new hard rubber (so-called arniet) partitions for coagulating tanks, produced locally by a leading rubber estate, are in increasing demand. Arniet coagulating tanks have now also been introduced and are used on several estates.

Total exports of latex during the period under review represented 5,365,871 kilos of dry rubber, of which more than half was concentrated latex. At present practically all the concentrated latex is produced by the big concerns as patent difficulties cause the smaller man to be wary of it.

It is expected shortly to send a small shipment of concentrated latex prepared according to Dr. van Harpen's method to Europe. The A.V.R.O.S. holds the patent for this process (Netherlands patent No. 29,774).¹

New Concentrated Latex Processes

Archief Rubbercultuur issued a lengthy description of the experiments and findings in connection with the above method of creaming latex. The process recommended follows. Fresh 38% latex is first dehydrated by heating to 80 to 82° C. for 30 minutes, and the resultant rubber dispersion cooled to 30° C. To every liter of this dispersion is added 6 grams of potassium soap of coconut oil, calculated on the dry weight, and 5 grams of ammonia, calculated on the gas. The whole is stirred; the creaming agent in the form of a homogeneous jelly is added, and stirring proceeds again for an hour. For both technical and economical reasons, Tragon A seed gum is at present recommended as creaming agent.

The mixture is allowed to stand eighteen hours when the first serum is drawn off; the first concentrate is heated to 60° C. for eight hours and allowed to cool gradually. After two days the serum is again drained off; the second concentrate is stirred, sieved, and finally drawn off. In this way is obtained a concentrate containing 62.38% of dry rubber and having a viscosity of 3,720 at 20° C. and a specific gravity of 0.9471.

¹ See INDIA RUBBER WORLD, July 1, 1933, p. 51.

² Ibid., Dec., 1933, p. 51.

Details of Dr. Kraay's method of creaming latex² are now also available. This method (patent application, No. 67,584, Neth.) appears much simpler than the preceding process. First a 1% dispersion in water is prepared of Konnyaku flour (obtained from *Amorphophallus Rivierii* Durrieu), the flour being stirred long enough to allow it to swell. Then to 100 parts by volume of fresh, ammoniated latex are added about 25 parts by volume of the flour dispersion; the whole is stirred for about 15 minutes. The mixture is next allowed to stand at tropical temperature (28 to 30° C.) for a few hours when it is found to have separated into two well-defined layers, the upper containing all the rubber; while the lower, transparent and pale yellow, is practically entirely free from rubber. Even treatment with acid fails to yield any more rubber. The rubber content of the upper portion is now about double that of the material started with.

It is pointed out that not only does this new creaming agent act more rapidly than the usual gums and colloidal substances, but it works at ordinary tropical temperature without extra heating being required; then it is much cheaper than the usual agents, and the cream obtained has the viscosity suited for manufacturing purposes.

Tire Import Restrictions

As from December 3, 1935, and for a period of ten months the importation into Netherland India of tires and tubes for motor vehicles is subject to quota. It is understood that the Government has decided on this measure in order to give the Goodyear tire factory a good start. Especially Japanese tires will be affected by the order since during the last few years considerable amounts have entered the country where their low price obtained a ready demand for them. The quota for automobile and motorcycle tires is 1,673,000 kilos, and for tubes, 163,300 kilos.

Production Raised

The I.R.R.C., recognizing the validity of the Netherland India claim for a higher quota, has decided to raise the basic figure for 1936 by 57,000 tons, that for 1937 by 53,500 tons, and that for 1938 by 55,000 tons. The revised standard production for 1936 is therefore 500,000 tons against 443,000 tons; for 1937, 520,000 tons instead of 467,000 tons, and for 1938, 540,000 tons instead of 485,000 tons.

Malaya

Data from the Director of Agriculture, Straits Settlements, and adviser on Agriculture, Malay States, H. A. Tempany, show that during 1934 estates of over 100 acres planted up 9,030 acres of new rubber and estates of less than 100 acres, 6,763 acres, in all, 15,793 acres. The total area under rubber in Malaya in 1934 was 3,303,823 acres, of which 2,018,379 acres comprised estates of 100 acres and over, and 1,285,444 estates of under 100 acres. The total mature area on estates of the first group was 1,582,591 acres.

Comparative figures for 1932, 1933, and 1934 show a progressive decrease in the acreages out of tapping on estates of 100 acres and over. In December, 1932, 314,825 acres, or 22.1% of the total mature area, were out of tapping; in December, 1933, 248,500 acres, or 16.7%, and in December, 1934, 225,165 acres, or 14.3%. The decline was particularly marked for estates which have ceased tapping entirely, for which the 1932 figure was 141,448 acres, or 9% of the total mature area, 1933, 72,483 acres, or 4.9%, and 1934, 33,613 acres, or 2.1%.

Interest continues in budgrafting and seed-selection, and ample advantage appears to be taken of the permission to replant areas as provided under the rubber regulation scheme, as the following table shows:

	1933		1934	
	No. of Areas	Total Acreage	No. of Areas	Total Acreage
Federated				
Malay States.....	338	89,162	354	103,362
Straits Settlements.....	44	4,572	49	7,769
Unfederated				
Malay States.....	121	70,825	174	93,560
Total.....	503	164,559	577	204,691

The increase in the Unfederated Malay States is particularly interesting.

The output of rubber in Malaya during 1934 came to 479,371 tons, against 459,836 tons in 1933. Production by the estates of 100 acres and over increased about 10% in 1934; while that of those under 100 acres in size declined somewhat.

Exports of concentrated latex increased considerably: 14,172 tons, against 10,470 tons in 1933, 5,192 tons in 1932, and 1,925 tons in 1931. The 1934 shipments included: latex with a dry rubber content of under 4.8 pounds per gallon, 5,445 tons, dry equivalent; 4.8 to 5.7 pounds per gallon, 6,002 tons; over 5.7 pounds per gallon, 2,725 tons.

Probably because of the failure of the well-known Chinese manufacturer of rubber goods, Tan Kah Kee, the amount of rubber retained locally for manufacturing purposes fell from 2,878 tons in 1933 to 872 tons.

As to methods of preparation, estates are installing more modern smoke houses. The Subur smoke house, a one-story building of separate compartments with racks on trolleys and an underground flue, is successfully used on a number of estates and is recommended by the Rubber Research Institute. One or two estates prepare hot-

air dried sheet for special consumers. One large concern exports practically all its crop as concentrated latex; a few others prepare and ship creamed concentrated latex and ordinary field latex. Revertex is shipped by two estates in Johore. A number of "dopes" for treating the interior of iron containers to prevent discoloration of latex (regarding which there has been much complaint) have been examined, but no really satisfactory product has yet been discovered, although one or two appear promising.

A number of big rubber companies have recently embarked on replanting schemes, some of which are quite considerable. Thus one large concern is to cut out and replant 600 acres of old rubber; while another has already started replanting 500 acres. Apparently local planters have taken to heart the advice given them by Victor Lowinger to replant promptly to qualify for higher assessment by the time the next international restriction agreement is considered.

The Shum Yip Leong Rubber Works, Klang, which has a branch at Ipoh, produces bicycle tires and tubes said to be not only of very good quality, but exceptionally cheap.

Burma

The first rubber factory in Burma is reported to have started production of rubber and canvas shoes at Kamayut near Rangoon. A daily output of 10,000 pairs of shoes is expected, and later on tires and tubes will also be manufactured.

Japan

Hitherto Americans held 51% of the shares of the Japanese branch of the Goodrich company, the Yokohama Rubber Co., while the remainder was in the hands of the Japanese Furukawa Denki Kogyo K. K. Now the latter concern has acquired the rest of the shares for the sum of 2,880,000 yen.

India

The growing use of motor vehicles in India is developing a strong interest in the manufacture of tires, an interest which has received added stimulus from the recent adoption of rubber tires for bullock carts. Another rubber factory was recently launched at Bombay, the All-India Tire & Rubber Mfg. Co., which will manufacture, import, and deal in all kinds of rubber and rubber goods and particularly engage in remolding rubber tires.

Canada

(Continued from page 58)

ber footwear, have increased from Japan, Hong Kong, and Straits Settlements, but the United States surpasses

all other countries combined as a source of Canadian imports of rubber products as a total.

Canada has always been an important market for United States exports of rubber products, despite or perhaps even because of American control of many of the Canadian factories. Some of the products shipped to Canada are in the nature of semi-finished manufactures, including reclaimed rubber, certain rubberized fabrics, and certain hard rubber items. Others are in the nature of novelties and specialties in which the Canadian industry is often not strongly competitive. Nearly every class of rubber products is, however, exported to Canada to some extent each year.

UNITED STATES EXPORTS OF RUBBER PRODUCTS

Year	Thousands of Dollars—		Exports to Canada
	Total Exports		
1927.....	\$68,658	\$4,607	6.7%
1930.....	58,906	3,899	6.6%
1933.....	17,826	1,137	6.4%
1934.....	21,762	1,655	7.6%
1935*.....	16,370	1,510	9.2%

*Nine months.

Exports to Canada formed an increasing share of United States total exports of rubber products in 1934 and 1935, as such exports have increased more rapidly than exports to other foreign markets. Under the old tariff rates our 1934 exports to Canada increased 43% over the 1923 value, and during the first nine months of 1935 the value was 23% greater than in the same period of 1934. The total value, nevertheless, is still far less than in 1930, for example.

The changes effective in Canadian tariff rates on rubber products, as a result of the trade agreement with the United States, are usually from the former general tariff rate to the intermediate rate. Several former 35% ad valorem rates were reduced to 30% [tires, hose, mats and matting, rubber clothing, (raincoats 30%, but not less than 50¢ each) and rubberized fabrics]; there were several 2½% reductions (rubber belting new rate 25%, rubber boots and shoes new rate 22½%; hard rubber tubes for making fountain pens, and blanks for making combs 7½% new rate); rubber thread was reduced from 15% to 10%, canvas rubber-soled shoes from 40% to 35%, and certain rubber goods not specified from 27½% to 22½%. Reclaimed and scrap rubber were not affected, entering Canada duty free. These rate changes, while all fractional, reduce the tariff barriers impeding imports from the United States and should, therefore, tend to facilitate transactions.

The United States concessions to Canada under the agreement included no changes in the rates on rubber products imported into the United States.

B. P. Waugh on January 2 joins the Woodstock Rubber Co., footwear manufacturer, Woodstock, Ont., as chemist.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Nov. 2	Nov. 30	Dec. 7	Dec. 14	Dec. 21
Nov.	13.17	.....	.....	.....	.....
Dec.	13.21	13.21	13.04	13.14	13.22
Jan. ....	.....	13.28	13.12	13.22	13.26
Mar.	13.46	13.43	13.32	13.40	13.45
June	13.70	13.66	13.52	13.60	13.69
Sept.	13.90	13.89	13.71	13.80	13.90
Oct.	13.96	13.96	13.78	13.87	13.96
Nov. ....	.....	.....	13.85	13.94	14.03
Volume per week (tons).	15,060	17,150	10,840	7,020	7,540

THE above table gives the nearest first and last week-end closing prices of the month previous to that just closed, also the week-end closing prices of each week of last month up to time of going to press. This plan sets forth the general price trends in the briefest possible manner.

During December, as was also true in November, the price level of No. 1 smoked sheet in the futures market remained in general just over 13¢. Exception to this came with news, December 3, of the International Rubber Regulation Committee allowing a 57,000-ton increase of the Netherlands India basic quota. This change brought about a 40-point drop, carrying the price of near futures under 13¢, December, for instance, to 12.73. The effect was short lived, however, and recovery rapid with the week ended December

7 closing above the 13¢ level again.

The general firmness of the market during the past several months reflects the trend of restriction to the gradual reduction of world stocks, also the improved business of the rubber industry in the United States. Price fluctuations with few exceptions have been of small range during December and then seemed to be influenced mainly by the character of factory demand.

New York Outside Market

With the exception of two days during the first week of December, No. 1 smoked sheet has held a price of 13¢ or above. It dropped below that figure in sympathy with the futures market on receipt of the Netherlands India quota increase by the I.R.R.C. Active factory demand at these lower levels, however, brought a quick recovery. Factory demand has been consistently good as would be expected with the rate of manufacturing that has been maintained. The week-end closing prices for the past two months follow: November 2, 13½¢; November 9, 13¼¢; November 16, 13½¢; November 23, 13½¢; November 30, 13½¢; December 7, 13½¢; December 14, 13½¢; and December 21, 13¼¢.

Consumption of crude rubber in the United States for November was 42,778 long tons, against 42,436 in October.

New York Quotations

New York outside market rubber quotations in cents per pound

Plantations	Dec. 26, 1934	Nov. 25, 1935	Dec. 26, 1935
Rubber latex, normal gal.	54	50	55
Sheet			
Ribbed, smoked,			
spot	12½/12½	13	13¼/13½
Jan.-Mar.	13½/13½	13½/13½	13½/13½
Apr.-June	13½/13½	13½/13½	13½/13½

Crepe			
No. 1 thin latex,			
spot	13¼/13½	13½/13½	13½/13½
Jan.-Mar.	13½/13½	13½/13½	13½/13½
Apr.-June	13½/13½	13½/13½	13½/13½
No. 3 Amber, spo.	10½/10½	12¼	13 /13½
No. 1 Brown ...	11½/11½	12½/12½	13½/13½
Brown rolled ...	9¾/9¾	12¼/12¼	12¼/12½

Paras			
Upriver fine	9¼	13¼	13
Upriver fine	*12¾	*15¾	*15¾
Upriver coarse....	7	9	9
Upriver coarse....	*10¾	*12½	*12½
Islands fine	9	13¾	13
Islands fine	*12¼	*15¾	*15¾
Acre, Bolivian fine	9½	13½	13½
Acre, Bolivian fine	*12½	*16	*15¾
Beni, Bolivian ...	9¼	13¼	13½
Madeira fine	9¾	13¼	13

Cauchó			
Upper ball	7	9	9
Upper ball	*10¼	*12½	*12½
Lower ball	6½	8½	8½

Pontianak			
Bandjermasin ...	6	6½	6½
Pressed block ...	10	13½	12½
Sarawak	6	6½	6½

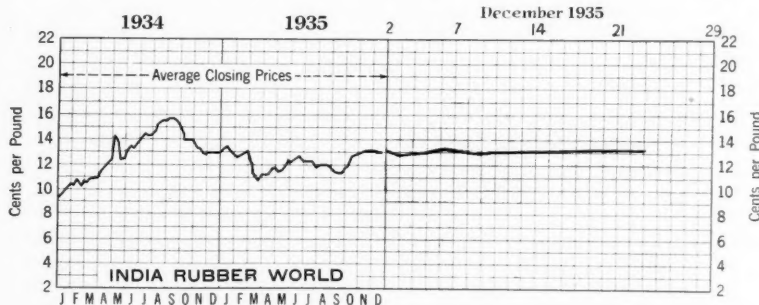
Guayule			
Duro, washed and dried	12	12	12
Ampar	13	13	13

Africans			
Rio Nuñez	12	15	13½
Black Kassai ...	19	15	13½
Prime Niger flake.	25	25	25

Gutta Percha			
Gutta Siak	9½	12½	12½
Gutta Soh	14	13	13
Red Macassar ...	1.50	1.25	2.20

Balata			
Block, Ciudad			
Bolivar	38	30	30
Manaos block	32	28	27
Surinam sheets ..	38	33	35
Amber	43	36	38

*Washed and dried crepe. Shipments from Brazil.



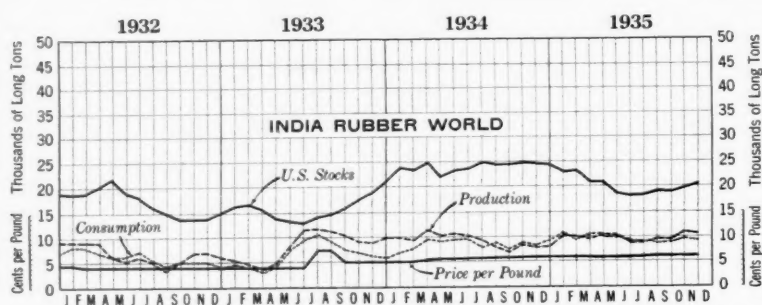
New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents per Pound

	November, 1935										December, 1935										
	25	26	27	28*	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. 1 Ribbed Smoked Sheet	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
No. 2 Ribbed Smoked Sheet	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 3 Ribbed Smoked Sheet	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 4 Ribbed Smoked Sheet	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 1 Thin Latex Crepe	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
No. 1 Thick Latex Crepe	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½	13½
No. 1 Brown Crepe	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 2 Brown Crepe	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 2 Amber	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 3 Amber	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
No. 4 Amber	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½
Rollad Brown	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½	12½

*Holiday.

RECLAIMED RUBBER



Production, Consumption, Stocks, and Price of Tire Reclaim

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % to Crude	U. S. Stocks*	Exports
1933	99,974	81,612	20.1	20,746	3,583
1934	110,010	100,597	22.3	23,079	4,737
1935					
January	10,465	11,261	23.9	22,291	517
February	10,072	9,374	21.7	22,989	532
March	9,741	10,549	24.8	20,637	310
April	10,315	10,466	23.4	20,521	476
May	10,223	9,938	23.9	18,541	402
June	8,590	8,710	23.8	17,932	283
July	8,421	8,396	23.1	17,810	384
August	9,557	8,795	22.4	18,272	320
September	9,041	8,774	23.4	18,260	442
October	11,926	9,662	22.8	19,640	579
November	11,482	9,084	21.2	21,478	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

THE demand for reclaim slackened about the middle of December, owing to the approach of the annual inventory period. Rubber manufactur-

ers in all lines anticipate pronounced resumption of demand for rubber products shortly after January 1. Government supported projects of the P.W.A. are recognized as strongly influential in support of this revival. Reclaimers expect the demand for their products will continue active for the next six months.

November statistics on production and consumption closely approximate those for October. Stocks on hand November 30 were reported as 21,478 long tons, a gain of 1,838 long tons over those of October 31.

Prices on standard grades are quoted unchanged from one month ago except in the case of No. 1 Floating Tubes, which advanced 1¢ to 14¢.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for November, 1935:

Rubber Exports: Ocean shipments from Singapore, Penang, Malacca, and Port Swettenham

November, 1935

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	7,011	307
United States	19,105	459
Continent of Europe	8,944	336
British possessions	1,591	13
Japan	4,879	47
Other countries	448	7
Totals	41,978	1,169

Rubber Imports: Actual, by Land and Sea

November, 1935

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	2,930	707
Dutch Borneo	2,177	98
Java and other Dutch islands	98	2
Sarawak	1,233	123
British Borneo	278	15
Burma	454	14
Siam	1,311	844
French Indo-China	35	90
Other countries	101	8
Totals	8,617	1,901

New York Quotations

December 26, 1935

Auto Tire	Sp. Grav.	¢ per lb.
Black Select	1.16-1.18	5 / 5½
Acid	1.18-1.22	6 / 6½
Shoe		
Standard	1.56-1.60	6 / 6½
Tube		
No. 1 Floating	1.00	14 / 14½
Compounded	1.10-1.12	7 / 7½
Red Tube	1.15-1.30	6½ / 7½
Miscellaneous		
Mechanical Blends	1.25-1.50	3½ / 4½
White	1.35-1.50	8 / 9½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

THE market for all grades of rubber scrap holds very steady and firm, with a slightly upward tendency.

BOOTS AND SHOES. Moderate uniform demand continues. This item rarely fluctuates very much.

INNER TUBES. Market continues very strong on all grades at higher prices. Export demand is good, and prices are meeting the domestic market.

TIRES. These stocks are in better demand than one month ago, with prices trending a little higher.

SOLID TIRES. The demand for both domestic and foreign consumption is improving slightly. Prices are steady.

MECHANICALS. All grades are firm and in fair demand. Prices remain unchanged.

HARD RUBBER. Stocks are very scanty; while the actual supply is diminishing. Prices are unchanged.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

December 26, 1935

Boots and Shoes	Prices
Boots and shoes, black	lb. \$0.01 / \$0.01½
Colored	lb. .00¾ / .00¾
Untrimmed arctics	lb. .00¾ / .00¾

Inner Tubes

No. 1, floating	lb. .08½ / .09
No. 2, compound	lb. .03¾ / .03¾
Red	lb. .03¾ / .03¾
Mixed tubes	lb. .03¾ / .03¾

Tires (Akron District)

Pneumatic Standard		
Mixed auto tires with beads	ton 7.50	/ 8.00
Beadless	ton 11.75	/ 12.00
Auto tire carcass	ton 9.50	/ 10.00
Black auto peelings	ton 16.00	/ 17.00
Solid		
Clean mixed truck	ton 35.00	/ 36.00
Light gravity	ton 38.00	/ 39.00

Mechanicals

Mixed black scrap.....	ton	15.00	/17.00
Hose, air brake	ton	14.00	/15.00
Garden, rubber covered...	ton	13.00	/13.50
Steam and water, soft...	ton	13.00	/13.50
No. 1 red	lb.	.02¾	.02¾
No. 2 red	lb.	.01½	.01¾
White druggists' sundries..	lb.	.02¾	.03
Mechanical	lb.	.02	.02½

Hard Rubber

No. 1 hard rubber	lb. .11½ / .11½
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New Incorporations

Davis Rubber Co., Little Rock, Ark. Capital \$1,250. H. O. and H. S. Davis. Company's plant is at 1600 E. Fifteenth St.

Fabest Rubber Mat Co., Inc., 29 Greene St., Hackensack, N. J. Capital \$125,000. P. Faber, 275 Beech St., J. Faber, 267 Beech St., and A. Sylvester, 29 Greene St., all of Hackensack. Manufacture rubber products and novelties of all kinds.

Rubatex Products, Inc., Bedford, Va. Maximum capital \$1,000,000. F. W. Peel, agent in charge of business. Manufacture and develop rubber products.

COMPOUNDING INGREDIENTS

CARBON BLACK. The market continues steady. Consumption for the past few months has exceeded production, but this situation will be corrected shortly when additional production comes into operation. During the past year the cost of production increased because of the regulations imposed on production in Texas and also because of the emergency freight. However no changes have been made in prices for the coming six months. Preliminary schedules indicate good prospects.

"DuPRENE."¹ Announcement is made in the current advertising that the price of "DuPRENE" has been reduced 5¢ per pound. While this fact is not spectacular, it is important as a forerunner of

¹ Trade mark registered.

several price reductions which the producer of this material hopes will take place during the next two years.

FACTICE. Despite restricted business due to temporary closing down for inventory optimistic views prevail as to the volume of business to be done in the next six months. No radical changes in price are expected.

LITHARGE. Prices have been steady since mid-October, but they may rise soon owing to the sustained advance of pig lead.

RUBBER CHEMICALS. The demand is steady for these essential materials. Prices generally are unchanged, with higher ones a possibility. In fact minor price revisions are being scheduled on some items.

RUBBER SOLVENTS. A broad demand exists for solvents, notably in the tire and proofing divisions of the trade.

TITANIUM PIGMENTS. Sales to the rubber trade during the last quarter were very satisfactory. At present seasonal slackness prevails, but takings against contracts have been quite satisfactory. Contract renewals for the first half of 1936 have far exceeded producers' expectations. Prices continue firm at quoted levels, and contracts for the first six months of 1936 are being written on the current basis.

ZINC OXIDE. Contracts for the first half of 1936 are being made at the prices prevailing since October 1. Anticipation of a price rise later is stimulating acceptance of contracts for 1936.

New York Quotations

December 26, 1935

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered.....lb.	\$0.02	/\$0.03½
Rottenstone, domestic.....lb.	.03	/ .03½
Silica, 15.....ton	38.00	

Accelerators, Inorganic

Lime, hydrated.....ton	20.00	
Litharge (commercial).....lb.	.06¼	/ .07
Magnesia, calcined, heavy.....lb.	.04	
carbonate.....lb.	.06¼	/ .07

Accelerators, Organic

A-1.....lb.	.21	/ .25
A-5-10.....lb.	.33	/ .36
A-10.....lb.		
A-11.....lb.	.60	/ .75
A-16.....lb.	.55	/ .65
A-19.....lb.	.56	/ .75
A-32.....lb.	.70	/ .80
A-37.....lb.		
Accelerator 49.....lb.		

85.....lb.		
87.....lb.		
122.....lb.		
552.....lb.		
808.....lb.		
833.....lb.		

Acrin.....lb.		
Aldehyde ammonia.....lb.		
Altax.....lb.		
Beutene.....lb.		
Butyl Zimate.....lb.		
C-P-B.....lb.		
Captax.....lb.		
Crylene.....lb.		
Paste.....lb.		
D-B-A.....lb.		
Di-Esterex.....lb.		
Di-Esterex-N.....lb.		
DOTG.....lb.		
D.O.T.T.U.....lb.		
DPG.....lb.		
Ethylideneaniline.....lb.		
Formaldehyde P.A.C.....lb.		
Formaldehydeaniline.....lb.		
Formaldehyde-para-toluidine.....lb.		
Guantal.....lb.	.42	/ .51
Hepteen.....lb.		
Base.....lb.		

Hexamethylenetetramine.....lb.		
Lead oleate, No. 999.....lb.	.115	
White.....lb.	.11	
Methylenedianiline.....lb.		
Monex.....lb.		
Novex.....lb.		
Ovac.....lb.		
Pipolene.....lb.		

R-2.....lb.	1.50	/ 1.50
Base.....lb.	4.55	/ 5.00
R & H 50-D.....lb.		
Safex.....lb.		
Super-sulphur No. 1.....lb.		
No. 2.....lb.		
Tapidone.....lb.		
Tetronex A.....lb.		
Thiocarbamilide.....lb.		
Thionex.....lb.		

Trimene.....lb.		
Base.....lb.		
Triphenyl guanidine (TPG).....lb.		
Tuads.....lb.		
Ureka.....lb.	\$0.62	/\$1.00
Blend B.....lb.		
C.....lb.	.58	/ .69
Vulcanex.....lb.		
Vulcanol.....lb.		
Vulcone.....lb.		
Z-B-X.....lb.		
Z-88-P.....lb.	.48	/ .60
Zenite.....lb.		
A.....lb.		
B.....lb.		
Zimate.....lb.		

Activator

Barak.....lb.		
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Age Resisters

Age-Rite Gel.....lb.		
HP.....lb.		
Powder.....lb.		
Resin.....lb.		
Syrup.....lb.		
White.....lb.		

Akroflex A.....lb.		
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B.....lb.		
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C.....lb.		
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Albasan.....lb.		
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Antox.....lb.		
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A-V-A-R.....lb.		
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B-L-E.....lb.		
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Flectol B.....lb.		
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H.....lb.		
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White.....lb.		
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M-U-F.....lb.		
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Neozone (standard).....lb.		
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A.....lb.		
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C.....lb.		
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D.....lb.		
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E.....lb.		
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Oxynone.....lb.		
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Parazone.....lb.		
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Permalux.....lb.		
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Solux.....lb.		
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Thermoflex.....lb.		
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A.....lb.		
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V-G-B.....lb.		
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Alkalies

Caustic soda, flake, Colum- bia (400 lb. drums).....100 lbs.	3.00	/ 4.00
liquid, 50%.....100 lbs.	2.25	
solid (700 lb. drums).....100 lbs.	2.60	/ 3.60

Antiscorch Materials

Antiscorch T.....lb.		
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Cumar RH.....lb.	.085	
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Retarder B.....lb.		
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W.....lb.		
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T-J-B.....lb.		
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U.T.B.....lb.		
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Antisun Materials

Heliozone.....lb.		
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Sunproof.....lb.		
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Binder, Fibrous

Asbestos.....ton	\$30.00	
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Brake Lining Saturants

B. R. C. No. 553.....lb.	.015	/\$0.017
B. R. T. No. 3.....lb.	.015	/ .017

Colors

BLACK

Lampblack (commercial).....lb.	.15	
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BLUE

Brilliant.....lb.		
Prussian.....lb.		
Toners.....lb.	.80	/ 3.50
Ultramarine, dry, Group 1.....lb.	.14	

BROWN

Mapico.....lb.	.13	
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GREEN

Brilliant.....lb.		
Chrome, light.....lb.	.20	
medium.....lb.	.20	
oxide.....lb.	.18½	

Dark

Guignet's.....lb.	.70	
Light.....lb.		
Toners.....lb.	.85	/ 3.50

ORANGE

Lake.....lb.		
Toners.....lb.	.40	/ 1.60

ORCHID

Toners.....lb.	1.50	/ 2.00
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PINK

Toners.....lb.	1.50	/ 4.00
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PURPLE

Permanent.....lb.		
Toners.....lb.	.60	/ 2.00

RED

Antimony.....lb.		
Crimson, 15/17%.....lb.		
R. M. P. No. 3.....lb.	.46	
Sulphur free.....lb.	.48	

Golden 15/17%.....lb.		
7-A.....lb.	.33	
Z-2.....lb.	.22	

Aristi.....lb.		
Cadmium.....lb.	.70	/ .95
Chinese.....lb.		
Crimson.....lb.		
Mapico.....lb.		
Medium.....lb.		
Rub-Er-Red.....lb.	.09¼	
Scarlet.....lb.		
Toners.....lb.	.80	/ 2.00

WHITE

Lithopone (bags).....lb.	.04¼	/ .04¼
Albath Black Label-11.....lb.	.04¼	/ .04¼
Astrolith (5-ton lots).....lb.	.04¼	
Azolith.....lb.	.04¼	/ .04¼
Cryptone-19.....lb.	.06	/ .06¼
CB-21.....lb.	.06	/ .06¼
ZS No. 20.....lb.	.10¼	/ .10¼

New York Quotations

December 26, 1935

Prices Not Reported Will Be Supplied on Application

No. 86	ib.	\$0.10 1/2 / \$0.10 3/4
Sunolith (5-ton lots)	ib.	.04 3/4
Ray-Bar	ib.	
Ray-Cal	ib.	
Rayox	ib.	
Titanolith (5-ton lots)	ib.	.06
Titanox-A (50-lb. bags)	ib.	.17 / .18 3/4
B (50-lb. bags)	ib.	.06 / .06 3/4
C (50-lb. bags)	ib.	.06 / .06 3/4
Ti-Tone	ib.	
Zinc Oxide		
Anaconda, Green Seal		
No. 333	ib.	.06 / .06 1/4
Lead Free No. 352	ib.	.05 / .05 3/4
No. 570	ib.	.05 / .05 3/4
No. 577	ib.	.05 / .05 3/4
Red Seal No. 222	ib.	.05 3/4 / .05 3/4
U.S.P. No. 777 (bbis)	ib.	.08
White Seal No. 555	ib.	.06 3/4 / .06 3/4
Azo ZZZ-11	ib.	.05 / .05 3/4
44	ib.	.05 / .05 3/4
55	ib.	.05 / .05 3/4
66	ib.	.05 / .05 3/4
French Process, Florence		
White Seal-7 (bbis)	ib.	.06 3/4 / .06 3/4
Green Seal-8	ib.	.06 / .06 1/4
Red Seal-9	ib.	.05 3/4 / .05 3/4
Kadox, Black Label-15	ib.	.05 / .05 3/4
Blue Label-16	ib.	.05 / .05 3/4
Red Label-17	ib.	.05 / .05 3/4
Horse Head Special J	ib.	.05 / .05 3/4
XX Red-4	ib.	.05 / .05 3/4
23	ib.	.05 / .05 3/4
72	ib.	.05 / .05 3/4
78	ib.	.05 / .05 3/4
80	ib.	.05 / .05 3/4
103	ib.	.05 / .05 3/4
110	ib.	.05 / .05 3/4
St. Joe (lead free)	ib.	
Black Label No. 20	ib.	.05 / .05 3/4
Green Label No. 42	ib.	.05 / .05 3/4
Red Label No. 30	ib.	.05 / .05 3/4
U.S.P. X	ib.	.08 / .08 3/4
YELLOW		
Cadmolith (cadmium yellow)	ib.	.40 / .50
Lemon	ib.	
Mapico	ib.	.09 3/4
Toners	ib.	2.50
Dispersing Agents		
Bardol	ib.	.021 / .023
Darvan	ib.	
Factice—See Rubber Substitutes		
Fillers, Inert		
Asbestine, c.l., f.o.b. mills	ton	15.00
Barytes	ton	30.00
f.o.b. St. Louis (50		
lb. paper bags)	ton	22.85
off color, domestic	ton	20.00 / 25.00
white, imported	ton	29.00 / 32.00
Blanc fixe, dry, precip.	ton	.03 3/4 / .05
Calcene, c.l.	ton	37.50
Glue	ib.	.07 / .09
Infusorial earth	ib.	.02 / .03
Kalite No. 1	ton	
No. 3	ton	
Whiting		
Columbia Filler	ton	9.00 / 14.00
Domestic	100 lbs.	
Guilders	100 lbs.	
Hakuenka	ib.	
Paris white, English	stone	100 lbs.
Southwark Brand, Com-		
mercial	100 lbs.	
All other grades	100 lbs.	
Suprex, white, extra light	ton	45.40 / 60.00
heavy	ton	45.40 / 60.00
Witco, c.l.	ton	7.00
Wood flour	ton	21.00 / 50.00
Fillers for Pliability		
Fumonox, c.l., f.o.b. works	ib.	.03
ex-warehouse	ib.	.04 3/4
P-33	ib.	
Thermax	ib.	
Velvetex	ib.	.03 / .04 3/4
Finishes		
IVCO lacquer, clear	gal.	
colors	gal.	
Rubber lacquer, clear	gal.	
colored	gal.	
Starch, corn, p.wd.	100 lbs.	3.23 / 3.43
potato	ib.	.04 3/4 / .05 3/4
Talc	ton	25.00 / 45.00
Dusting	ton	
Pyrex	ton	
Flock		
Cotton flock, dark	ib.	.11 / .13
died	ib.	.50 / .85
white	ib.	.14 3/4 / .20
Rayon flock, colored	ib.	1.25 / 1.60
white	ib.	1.10
Latex Compounding Ingredients		
Alphasol-OS	ib.	
Antox, dispersed	ib.	
Aquarex D	ib.	
F	ib.	
Aresklene	ib.	
Casein, domestic, ground,		
20-30 mesh	ib.	\$0.15 / \$0.15 3/4
Catalpo	ton	
Color pastes, dispersed	ib.	
Dispersaid	ib.	1.50
Dispersex 15	ib.	.95
20	ib.	.75
Emo, brown	ib.	.13
white	ib.	.13
Factice Compound, dis-		
persed	ib.	.30
Heliozone, Dispersed	ib.	
Igepon A	ib.	
Micronex, Colloidal (75 lbs.)	ib.	.11
320 lbs.	ib.	.08
Nekal BX (dry)	ib.	
Palmol	ib.	.10
Stablex A	ib.	1.75
B	ib.	.90
C	ib.	.30
Sulphur, Colloidal	ib.	
Vulcan Colors	ib.	
Zinc oxide, Colloidal	ib.	
Mineral Rubber		
B. R. C. No. 20	ib.	.0125 / .014
Black Diamond	ton	25.00
Genasco Hydrocarbon,		
granulated, (fact'y)	ton	
solid	ton	
Gilsonite Hydrocarbon		
(factory)	ton	
Hydrocarbon, hard	ton	
soft	ton	
Parmir Grade 1, l.c.l.	ton	31.00
Grade 2	ton	31.00
Pioneer	ton	
265*	ton	
Mold Lubricants		
Mold Paste No. 1	ib.	
Rusco mold paste	ib.	.12 / .30
Sericite	ton	65.00 / 70.00
Soapbark	ib.	
Soapstone	ton	25.00 / 35.00
Oil Resistant		
AXF	ib.	
Reclaiming Oils		
B. R. V.	ib.	.039 / .041
S. R. O.	ib.	.012 / .014
Reinforcers		
Carbon Black		
Aerflot Arrow Specifica-		
tion Black	ib.	.0535 / .0825
Arrow Compact Granulated		
Carbon Black	ib.	
"Certified" Spheron, Ca-		
bot	ib.	
Disperso (delivered)	ib.	.0445 / .0535
Dixie, c.l., f.o.b. New		
Orleans, La., Galveston		
or Houston, Tex.	ib.	.0445
c.l., delivered New York	ib.	.0535
local stock delivered	ib.	.07 / .08 3/4
Dixiedens, c.l., f.o.b. New		
Orleans, La., Galveston		
or Houston, Tex.	ib.	.0445
c.l., delivered New York	ib.	.0535
local stock delivered	ib.	.07 / .08 3/4
Excello, c.l., f.o.b. Gulf		
ports	ib.	.0445 / .0645
delivered New York	ib.	.0535 / .0735
l.c.l., delivered New		
York	ib.	.07 / .08 3/4
Gastex	ib.	.03 / .07
Kosmobile, c.l., f.o.b. New		
Orleans, La., Galveston		
or Houston, Tex.	ib.	.0445
c.l., delivered New York	ib.	.0535
local stock delivered	ib.	.07 / .08 3/4
Kosmos, c.l., f.o.b. New		
Orleans, La., Galveston		
or Houston, Tex.	ib.	.0445
c.l., delivered New York	ib.	.0535
local stock delivered	ib.	.07 / .08 3/4
Micronex Beads	ib.	
Mark II	ib.	
Standard	ib.	
W-5	ib.	
W-6	ib.	
Pelletex	ib.	.03 / .07
Supreme, c.l., f.o.b. Gulf		
ports	ib.	.0445 / .0645
delivered New York	ib.	.0535 / .0735
l.c.l., delivered New		
York	ib.	.07 / .08 3/4
Carbonex	ib.	.030 / .0375
Carbonex "S"	ib.	.0315 / .040
Clays		
Aerflot Paragon	ton	8.50
Suprex No. 1 Selected	ton	10.00
No. 2 Standard	ton	8.50
Dixie	ton	
Junior	ton	
McNamee	ton	
Par	ton	
Witco	ton	\$8.50
Cumar EX	ib.	.04
Reodorants		
Amora A	ib.	
B	ib.	
C	ib.	
D	ib.	
Para-Dors	ib.	
Rodo No. 0	ib.	
No. 10	ib.	
Rubber Substitutes or Factice		
Amberex	ib.	.26
Black	ib.	.07 / \$0.11
Brown	ib.	.08 / .14
Duphax A	ib.	.11
B	ib.	.11
Fac-Cel B	ib.	.13
C	ib.	.13
White	ib.	.08 / .13
Softeners		
B. R. C. No. 555	ib.	
B. R. T. No. 7	ib.	
Burgundy pitch	ib.	.05
(net weight)	ib.	.06 3/4
Cycline oil	gal.	.15 / .28
Glycerine 88% com.	ib.	.12 3/4 / .12 3/4
Palm oil (Witco)	ib.	.05 3/4
Petrolatum, light amber	ib.	.03 3/4 / .03 3/4
Pigmentar (drums)	gal.	.25 / .26
Pigmentar oil (drums)	gal.	.25 / .26
Pine oil, dest. distilled		
(drums)	gal.	.43 / .46
pitch	bbil.	6.00
tar (drums)	gal.	.25 / .26
Plastogen	ib.	
Reogen	ib.	
Rosin oil, compounded	gal.	.40
R.P.A. No. 1	ib.	
Rubtack	ib.	.10
Tackol	ib.	.085 / .18
Tonox	ib.	
Powder	ib.	
Witco No. 20	gal.	.15
Softeners for Hard Rubber Compounding		
RSL Resin	ib.	
Resin C Pitch 55° C. M. P.	ib.	.0125 / .0145
Resin C Pitch 70° C. M. P.	ib.	.0125 / .0145
Resin C Pitch 85° C. M. P.	ib.	.0125 / .0145
Solvents		
Benzol 90% (drums)	gal.	.23
Beta-Trichlorethane	gal.	
Bondogen	ib.	
Carbon bisulphide	ib.	.05 3/4 / .08 3/4
tetrachloride	ib.	.05 3/4
Dipentene, commercial		
(drums)	gal.	.42 / .44
Rubber (Group 3, refinery)	gal.	.06 3/4 / .07 3/4
Solvesso No. 1, tank cars	gal.	.16
No. 2	gal.	.18
No. 3	gal.	.15
No. 4	gal.	.18
Turpentine, wood, dest. dis-		
tilled (drums)	gal.	.41 / .43
Stabilizers for Cure		
Fatty acids (tank cars)	ib.	.08
Laurex, ton lots	ib.	
Oleic acid (tank cars)	ib.	.08 3/4
Stearax B	ib.	.10 3/4 / .11 3/4
Beads	ib.	.084 / .094
Stearic acid, double pressed	ib.	.10 / .11
single pressed	ib.	.09 / .10
triple pressed	ib.	.12 3/4 / .13 3/4
Stearite	ib.	.08
Zinc stearate	ib.	.22
Synthetic Rubber		
"DuPrene" Latex Type		
50	gal.	
Type D	ib.	
"Thiokol" A (f.o.b. Yard-		
ville)	ib.	.35
Coating Materials	gal.	3.50 / 6.00
D	ib.	.75
Molding Powder	ib.	.75
Tackifier		
B. R. H. No. 2	ib.	.015 / .020
Varnish		
Shoe	gal.	1.45
Vulcanizing Ingredients		
Sulphur		
Chloride, drums	ib.	.03 3/4 / .04
Rubber	100 lbs.	
Telloy	ib.	
Vandex	ib.	
(See also Colors—Antimony)		
Waxes		
Carnauba, No. 3 chalky	ib.	
2 N.C.	ib.	
3 N.C.	ib.	
1 Yellow	ib.	
2	ib.	
Montan, crude	ib.	

* Trade mark registered.

Tire Molds

Making on time deliveries of accurately cut and finished molds for the leading tire makers has been our job since 1917.

A finely equipped plant and picked mechanics enable us to do the finest work at low prices.

Customers' confidences are respected.

May we quote on your next lot of molds?

Akron Equipment Co.
Akron
Ohio

Regular and Special Constructions of COTTON FABRICS

Single Filling Double Filling
and

**ARMY
Ducks**

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END
CLOSING PRICES

Futures	Nov. 2	Nov. 30	Dec. 7	Dec. 14	Dec. 21
Nov.	11.00				
Dec.	10.95	11.74	11.79	11.47	11.76
Mar.	10.80	11.53	11.58	11.23	11.28
July	10.78	11.26	11.40	11.01	10.46
Sept.	10.68	11.12	11.30	10.81	10.78
Oct.	10.62	11.04	11.25	10.72	10.69

THE above table gives the nearest first and last week-end closing prices of the month previous to that under review, also the week-end closing prices of each week of last month up to time of going to press. This plan permits tracing at a glance the prices of representative futures for approximately two consecutive months.

Middling cotton futures prices maintained a price position between 11 and 12¢ for the month of December except the distant months, which dipped below 11¢ during the last half of that period. Within the above mentioned limits fluctuations were frequent and the range fairly wide, reflecting the uncertainty of the outcome of the entire AAA program as the time approaches for a Supreme Court decision on the Hoosac Mills case and others that may indirectly affect the cotton situation. In addition there has been a widespread feeling here and abroad that something is wrong with our silver that will necessitate a change in Government policy, and discontent exists among traders because of the delay of the administration in announcing its 1936 acreage program. The stabilizing developments were: the Government December crop estimate of 10,734,000 bales, a reduction of 407,000 bales from the November forecast; the reduction also of crop estimates for India and Brazil of 718,000 and 111,000 bales respectively; the near high record world use of cotton in October; and the improved export showing this year, 3,168,951 bales to December 19 against 2,275,010 to that date last year.

Secretary of Agriculture Wallace approved a four-year cotton adjustment contract which proposes to base restriction on a total area of 44,500,000 with a minimum restriction in 1936 of 30% from that figure and payment to the farmer of about \$8.50 per acre for the acreage withheld from production. Other conditions were thought to be improvements as against past measures, but doubt is current as to whether the entire program is constitutional or not, with sentiment so allied with the negative possibility as to cause little demand for distant futures.

Cotton Fabrics

DRILLS, DUCKS, OSNABURGS, AND TENNIS. The market on these goods is characteristically quiet owing to the holiday season. Prices remain firm.

RAINCOAT FABRICS. Now that the Christmas trade is finished, the raincoat business is very quiet at present. All

WEEKLY AVERAGE PRICES OF MIDDLING
COTTON

Week Ended	Cents per Pound
Nov. 30	12.22
Dec. 7	12.23
Dec. 14	11.95
Dec. 21	11.83

New York Quotations

December 26, 1935

Drills

38-inch 2.00-yard	yd.	\$0.16
40-inch 3.47-yard .....		.09½
50-inch 1.52-yard .....		.22¾
52-inch 1.85-yard .....		.18¾
54-inch 1.90-yard .....		.17½
52-inch 2.20-yard .....		.16¾
52-inch 2.50-yard .....		.14¾
59-inch 1.85-yard .....		.18

Ducks

38-inch 2.00-yard D. F.	yd.	.16½/.16¾
40-inch 1.45-yard S. F. ....		.22¾
51½-inch 1.35-yard D. F. ....		.23¾
72-inch 1.05-yard D. F. ....		.32¾/.33¾
72-inch 17.21-ounce .....		.38¾

MECHANICALS

Hose and belting	lb.	.35
------------------------	-----	-----

TENNIS

52-inch 1.35-yard	yd.	.237½
-------------------------	-----	-------

*Hollands

GOLD SEAL

20-inch	yd.	.10
30-inch No. 72 .....		.19
40-inch No. 72 .....		.20

RED SEAL

20-inch	yd.	.08¾
30-inch .....		.16¾
40-inch .....		.17½
50-inch .....		.23

Osnaburgs

40-inch 2.34-yard	yd.	.12¾/.13½
40-inch 2.48-yard .....		.11¾/.12¾
40-inch 2.56-yard .....		.11½
40-inch 3.00-yard .....		.10½
40-inch 7-ounce part waste .....		.11¾
40-inch 10-ounce part waste .....		.16¾
37-inch 2.42-yard .....		.13

Raincoat Fabrics

COTTON

Bombazine 60 x 64	yd.	.09
Plaids 60 x 48 .....		.11½
Surface prints 60 x 64 .....		.13½
Print cloth, 38½-inch, 60 x 64 .....		.06¾

SHEETINGS, 40-INCH

48 x 64, 2.50-yard	yd.	.11
64 x 68, 3.15-yard .....		.10¾
56 x 60, 3.60-yard .....		.09¾
44 x 48, 3.75-yard .....		.07½

SHEETINGS, 36-INCH

48 x 64, 2.50-yard	yd.	.06¾
44 x 40, 6.15-yard .....		.05¾

Tire Fabrics

BUILDUP

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.36
---	-----	-----

CHAFER

14 ounce 60" 20/8 ply Karded peeler	lb.	.36
9¾ ounce 60" 10/2 ply Karded peeler	lb.	.34

CORD FABRICS

23/5/3 Karded peeler, 1¼" cotton	lb.	.36
15/3/3 Karded peeler, 1¼" cotton	lb.	.34
23/5/3 Karded peeler, 1¼" cotton	lb.	.40
23/5/3 Combed Egyptian	lb.	.52

LENO BREAKER

8¾ ounce and 10¼ ounce 60" Karded peeler	lb.	.36
--	-----	-----

*For less than 1,000 yards of a width add 10% to given prices.

concerns are starting to get together their new spring lines.

SHEETING. After an extended and satisfactory buying period the disposition of the trade is to wait until the Supreme Court renders its decisions early in 1936 in regard to the AAA and the Bankhead Act. Meantime very little market activity is expected. Prices, around the highs of the past nine months, are beginning to get on a satisfactory basis.

TIRE FABRICS. Prices are steady and unchanged in the face of moderate demand.

Konpruf Paint

The material known as Konpruf is made from rubber resin combined as a paint for application as a waterproof finish for swimming pools and water tanks. It is readily applied and is impervious to the action of water, alkalis, and mineral acids. It is available in various colors. Penola Inc.

Brazil

Early in October a bill was introduced into the Chamber of Deputies, which would authorize the creation of a Rubber and Nut Institute. Besides authorizing experimental work to improve the species, the proposed measure would regulate merchandising, warehousing, and the transportation of rubber and Brazil nuts. The institute, if created, would also be granted under the terms of the bill the right to purchase and market these products.

Rubber Bibliography

(Continued from page 50)

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UP-TO-DATE STAMPING PROCESS IN THE RUBBER INDUSTRY. St. Dorogi, *Kautschuk*, Nov., 1935, pp. 204-10.

ROLE OF PH IN THE LATEX INDUSTRY. M. Dérubère, *Caoutchouc & gutta-percha*, Nov. 15, 1935, pp. 17333-35.

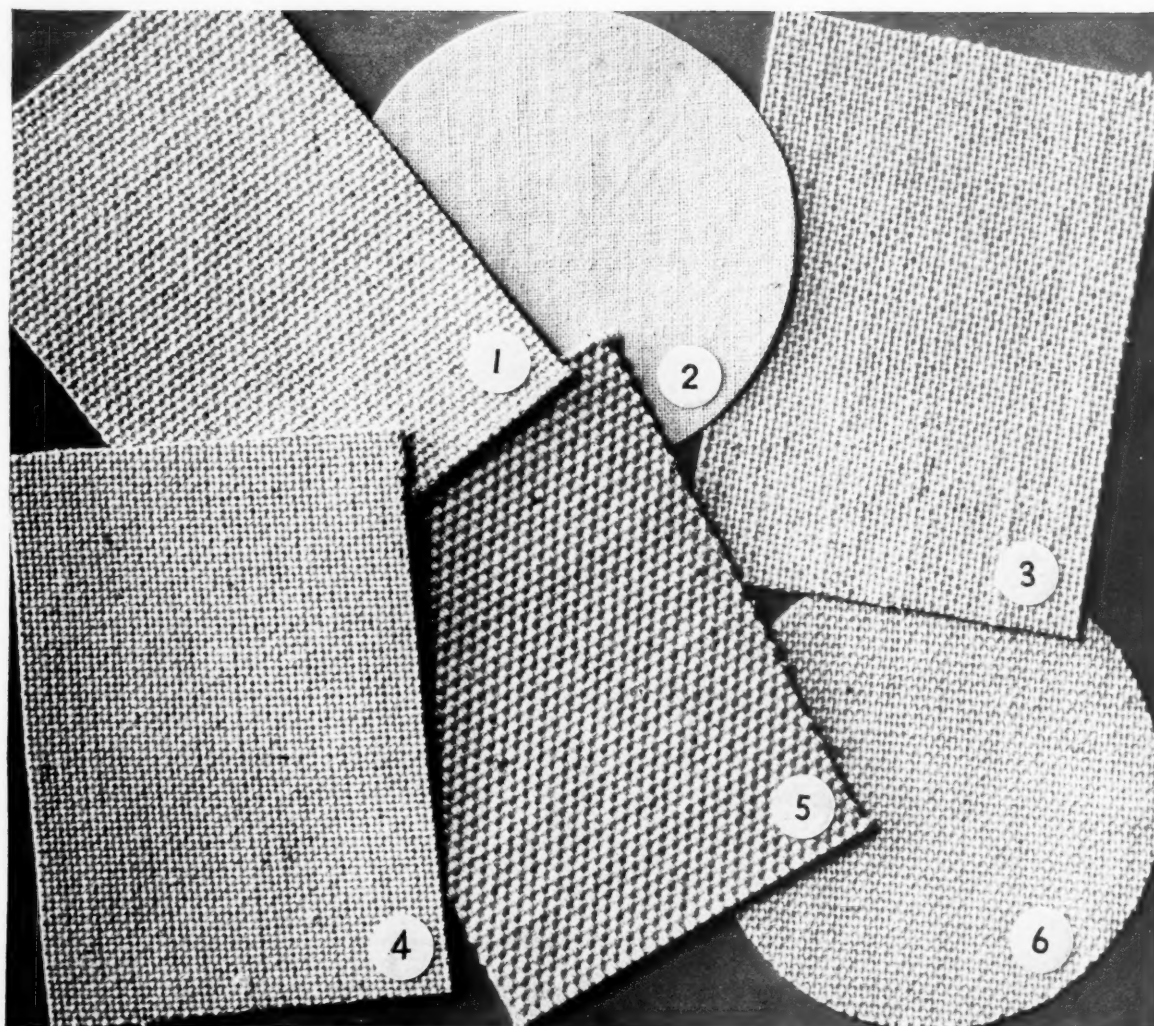
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ACTION OF ALCOHOLS ON ORGANIC SOLS (ESPECIALLY POLYSTYROL, RUBBER AND ACETYLCELLULOSE). H. Erbring and K. Sakurada, *Kolloid Z.*, Nov., 1935, pp. 191-201.

RECLAIM IN THE MANUFACTURE OF RUBBER SHOES. K. A. Hill, *Gummi-Ztg.*, Nov. 8, 1935, p. 1144.

CORROSION IN THE RUBBER INDUSTRY. *Gummi-Ztg.*, Nov. 22, 1935, pp. 1194-96.

RUSSIA'S SYNTHETIC RUBBER. P. Ruprecht, *Gummi-Ztg.*, Nov. 29, 1935, p. 1219.



FABRICS *for use with* RUBBER



With many years of experience in working with the engineers and purchasing agents of the leading rubber companies, we are in position

to supply both standard and special fabrics to suit your particular needs.

Seventeen mills and adequate engineering and laboratory facilities assure you of technical excellence and ultimate economy.

The fabrics illustrated above are identified by number in the next column.

1. COLUMBUS Sheeting
2. WEST POINT Osnaburg
3. SHAWMUT Belting Duck
4. WEST POINT Chafer Fabric
5. SHAWMUT Hose Duck

Our 538-page Handbook of Industrial Fabrics gives a very complete description of cotton, cotton manufacturing processes, uses for industrial fabrics, laboratory test methods, specifications, etc. Price \$2.00. One copy free to any well-rated rubber manufacturer in the United States, upon request on company letterhead.

WELLINGTON SEARS COMPANY

65 WORTH STREET

NEW YORK

IMPORTS, CONSUMPTION, AND STOCKS

CRUDE rubber consumption by United States manufacturers for November totaled 42,778 long tons, against 42,436 long tons for October, 1935, 1% above the October total and 23.1% above the November, 1934, figure of 34,748 (revised) long tons, according to R. M. A. statistics.

Crude rubber imports for November were 28,826 long tons, 16.1% below the October figure of 34,356 long tons and 20.4% under 36,233 long tons imported in November, 1934.

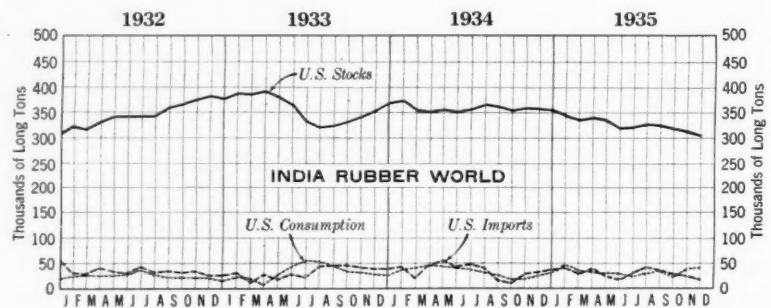
The estimated total domestic stocks of crude rubber on hand November 30 were 303,162 long tons, compared with October 31 stocks of 317,850 long tons and 362,826 long tons on hand November 30, 1934.

Crude rubber afloat to United States ports as of November 30 was 46,588 long tons, against 49,913 long tons afloat on October 31 and 38,625 long tons afloat on November 30, 1934.

London and Liverpool Stocks

Week Ended	Tons	
	London	Liverpool
Nov. 30.....	90,026	76,370
Dec. 7.....	88,904	76,622
Dec. 14.....	87,090	76,546
Dec. 21.....	87,664	77,430

REMINDER: HAVE YOU RENEWED YOUR subscription to INDIA RUBBER WORLD?



United States Stocks, Imports, and Consumption

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports*	U. S. Consumption†	U. S. Stocks, Dealers, Importers, Etc.†	U. S. Stocks Afloat†	Singapore and Penang		World Production (Net Exports)†	World Consumption Estimated†	World Stocks†
					U. K.—Public Warehouses, London, Liverpool†	U. S.—Dealers and Port Stocks†			
1933	411,615	401,000	365,000	55,606	86,505	44,884	853,100	798,900	616,370
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,016,715	959,556	678,994
1935									
January ..	42,059	47,103	346,084	42,066	148,337	59,609	79,502	89,216	671,954
February ..	35,383	43,187	337,332	42,969	155,727	57,586	75,325	90,494	657,717
March	44,041	42,620	338,700	44,485	162,012	55,100	66,671	88,112	652,659
April	43,545	44,714	334,954	37,651	165,064	48,827	76,534	80,261	652,471
May	26,866	41,568	319,281	44,375	167,745	54,740	77,940	71,543	649,991
June	38,340	36,623	320,470	55,581	171,303	51,770	74,598	66,043	648,579
July	46,880	36,384	330,528	49,018	174,227	49,958	71,305	79,719	655,154
August	38,665	39,242	329,548	47,724	177,250	46,482	77,569	80,620	659,851
September ..	34,569	37,553	326,236	43,413	174,894†	33,872	74,703	71,333	640,675
October ...	34,356	42,436	317,850	49,913	168,510	37,597	74,177	.....	627,363
November ..	28,826	42,778	303,162	46,588	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaus, and afloat. ¶Including an adjustment of 2,650 tons for loss by fire at Colonial Wharf.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.	Australia	Belgium	Canada	Central Europe	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1933	398,400	73,300	13,500	11,200	19,300	18,900	63,100	54,100	19,300	66,900	30,800	30,100	798,900
1934	438,941	158,481	9,642	9,116	28,439	23,427	50,405	59,330	21,403	69,934	47,272	43,166	959,556
1935													
Jan.	39,546	20,383	1,099	419	2,670	1,966	5,678	4,286	1,648	4,402	3,446	3,673	89,216
Feb.	45,999	15,609	848	399	1,558	2,547	4,670	3,513	4,357	5,585	1,810	3,599	90,494
Mar.	44,772	12,810	1,458	240	2,710	1,463	4,085	6,353	1,582	4,423	4,624	3,592	88,112
Apr.	40,061	11,574	1,150	520	1,063	1,491	3,368	5,820	1,653	6,635	3,387	3,539	80,261
May	29,962	12,498	671	982	3,929	1,565	3,900	6,050	935	5,432	1,937	3,682	71,543
June	31,410	10,253	496	1,065	1,435	1,576	3,270	4,551	1,831	3,375	3,088	3,693	66,043
July	47,694	9,454	520	572	1,319	1,079	3,308	4,929	1,298	4,486	1,823	3,237	79,719
Aug.	41,057	14,120	655	527	2,814	1,738	4,593	4,790	916	4,454	1,227	3,729	80,620
Sept.	35,256	11,223	*700	807	1,604	*1,900	3,810	5,453	1,696	3,591	1,593	*3,700	71,333

* Estimate. Source: Statistical Bulletin of the International Rubber Regulation Committee.

U. S. Crude and Waste Rubber Imports for 1935

Year	Plantations	Latex	Paras	Africa	Centrals	Guay.	Mani-coba and Matto Grosso	Totals		Balata	Miscellaneous	Waste
								1935	1934			
Jan.	41,188	599	201	30	41	..	..	42,059	46,204	26	553	..
Feb.	33,722	388	1,208	14	51	..	..	35,383	31,032	73	194	29
Mar.	42,373	967	513	167	21	..	..	44,041	44,605	55	659	40
Apr.	41,857	1,089	531	63	5	..	..	43,545	45,662	60	644	14
May	25,256	1,106	294	60	..	50	..	26,766	47,954	55	474	16
June	36,833	860	467	80	..	100	..	38,340	49,683	135	521	20
July	45,456	973	291	46	14	100	..	46,880	41,530	84	553	25
Aug.	37,199	1,170	166	65	5	50	..	38,655	33,248	25	484	18
Sept.	33,329	940	196	70	17	17	..	34,569	28,835	83	276	30
Oct.	32,816	1,236	143	43	75	43	..	34,356	35,298	27	555	26
Nov.	27,166	837	646	70	44	63	..	28,826	36,233	55	498	96
Total 11 mos. 1935	397,195	10,165	4,656	708	273	423	..	413,420	.....	678	5,411	314
Total 11 mos. 1934	426,094	10,286	3,289	166	49	400	..	440,284	1,079	6,152	668	.....

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1931	10,414,712	\$884,355
1932	11,388,156	601,999
1933	24,829,861	1,833,671
1934	29,276,134	3,633,253
1935		
Jan.	1,898,962	287,583
Feb.	1,282,941	179,583
Mar.	2,889,525	354,654
Apr.	3,854,892	415,100
May	3,197,450	380,844
June	1,324,776	152,665
July	2,563,366	303,518
Aug.	2,764,572	370,431
Sept.	2,347,111	291,652
Oct.	2,881,960	342,101

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

Patents and Trade Marks

MACHINERY

United States

- 2,018,327. **Cordage Machine.** K. R. Shaw, assignor to United Elastic Corp., both of Easthampton, Mass.
- 2,018,385. **Tensile Strength Tester.** D. C. Scott, assignor to Henry L. Scott Co., both of Providence, R. I.
- 2,018,675. **Casting Hollow Objects.** F. P. Hyde, Salem, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.
- 2,019,361. **Hollow Article Apparatus.** F. T. Roberts, Ridgewood, N. J., assignor to F. A. Daly, Pawtucket, R. I., as trustee.
- 2,019,543. **Thread Former.** E. A. Murphy, Birmingham, assignor to Dunlop Rubber Co., Ltd., London, both in England.
- 2,019,544. **Shoe Last.** C. M. Riddock, Andover, Mass.
- 2,019,709. **Latex-Treated Tubing Apparatus.** J. A. Kennedy, Pawtucket, R. I., assignor to Anaconda Wire & Cable Co., New York, N. Y.
- 2,019,888. **Vulcanizing Press.** H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.
- 2,020,023. **Tire Retreader and Remolder.** J. Flynn, assignor to Flynn & Collins, both of Los Angeles, Calif.
- 2,020,319. **Suede Surface Fabric Apparatus.** W. H. King, assignor to Pocono Co., both of Trenton, N. J.
- 2,020,497. **Collapsible Tire Building Form.** H. C. Bostwick, assignor to Akron Standard Mold Co., Akron.
- 2,020,669. **Vulcanizer.** T. H. Williams, assignor to National Rubber Machinery Co., both of Akron, O.
- 2,020,781. **Tire Changing Tool.** J. W. Henninger, El Paso, Tex.

Dominion of Canada

- 353,726. **Tire Spreader.** W. H. Dalrymple, Brucefield, Ont.
- 353,948. **Strip Rubber Apparatus.** B. F. Goodrich Co., New York, N. Y., assignee of C. W. Leguillon, Akron, O., both in the U. S. A.
- 353,949. **Tire Builder.** Goodyear Tire & Rubber Co., assignee of M. Lamertse, both of Akron, and C. E. Gardner, Cuyahoga Falls, and W. C. State, deceased, Akron, all in O.
- 354,003. **Tire Bead Apparatus.** Wingfoot Corp., Wilmington, Del., assignee of L. E. Morrison, New York, N. Y., both in the U. S. A.
- 354,005. **Strand Handler.** Wingfoot Corp., Wilmington, Del., assignee of G. A. Barber, Kent, O., U. S. A.
- 354,132. **Cordage Machine.** United Elastic Corp., assignee of K. R. Shaw, both of Easthampton, Mass., U. S. A.

United Kingdom

- 430,885. **Belting Vulcanizer.** A. H. Stevens, London. (Boston Woven Hose & Rubber Co., Cambridge, Mass., U. S. A.)

- 430,982. **Rubber Thread Apparatus.** H. Schuller, E. Matzner, and A. Kailich, all of Vienna, Austria.
- 430,999. **Vulcanizer.** J. Shaw & Sons (Salford), Ltd., and J. Shaw, both of Salford.
- 431,012. **Rubber Preparer.** R. T. Cooke and F. Shaw & Co., Ltd., both of Manchester.
- 431,031. **Rubber Thread Apparatus.** H. Schuller, E. Matzner, and A. Kailich, all of Vienna, Austria.
- 431,076. **Tire Builder.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)
- 431,198. **Compound Fabric Apparatus.** P. Blanchet and G. Tillie, both of Neuilly-sur-Seine, France.
- 431,217. **Tire Cutter.** D. Bridge & Co., Ltd., Castleton. (National Rubber Machinery Co., Akron, O., U. S. A.)
- 431,287. **Tire Lever.** W. Hardwick and R. Knowles, both of Heckmondwike, and L. Cooper, Liversedge.
- 431,381. **Inner Tube Gas Proofer.** Dunlop Rubber Co., Ltd., London, and W. H. Pearce and G. H. Perry, both of Birmingham.
- 432,110. **Cable Vulcanizer.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.
- 432,371. **Doll Mold.** F. C. Jones, London.

PROCESS

United States

- 2,017,856. **Shoe.** G. Goddu, Winchester, assignor to Littleway Process Co., Lynn, both in Mass.
- 2,018,508. **Wrinkled Surface Article.** A. E. Barnard, Waterbury, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
- 2,018,711. **Floor Covering.** A. Elmen-dorf, Chicago, Ill.
- 2,019,010. **Adhesive Tape.** F. W. Humphner, Oak Park, assignor to Mid-States Gummed Paper Co., Chicago, both in Ill.
- 2,019,031. **Gasket Material.** R. M. Waples, assignor to Garlock Packing Co., both of Palmyra, N. Y.
- 2,019,420. **Latex Impregnating Textile Materials.** L. S. M. Lejeune, Wasquehal, and J. E. C. Bongrand, Paris, both in France.
- 2,019,459. **Shoemaking.** F. Maccarone, Brooklyn, assignor to Del-Mac Shoe Process Corp., New York, both in N. Y.
- 2,019,489. **Sponge Rubber.** C. F. Flemming, assignor to Roth Rubber Co., both of Cicero, Ill.
- 2,019,531. **Varnishing Fabrics, Leather, Etc.** G. Galimberti and G. Peverelli, both of Milan, Italy.
- 2,020,182. **Rubber Shoe.** E. P. Hedolin, assignor to Elm City Rubber Co., both of New Haven, Conn.
- 2,020,255 and 2,020,256. **Applying and Removing Protective Coatings.** L. G. Copeman, assignor to Copeman Laboratories Co., both of Flint, Mich.

- 2,020,994. **Foam Rubber Goods.** W. H. Chapman, E. W. B. Owen, and D. W. Pounder, all of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

Dominion of Canada

- 353,674. **Cellular and Porous Rubber.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of U. Pestalozza, Milan, Italy.
- 353,827. **Sponge Rubber.** Industrial Process Corp., Saratoga Springs, N. Y., assignee of H. R. Minor, Chicago, Ill., both in the U. S. A.
- 353,828. **Heat Insulating Material.** Industrial Process Corp., Saratoga Springs, N. Y., assignee of H. R. Minor, Chicago, Ill., both in the U. S. A.
- 353,834. **Rubber-Fabric Material.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of E. Hazell, New York, N. Y., U. S. A.
- 354,114. **Water- and Greaseproof Paper.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of C. S. Johnson, Naugatuck, Conn., U. S. A.

United Kingdom

- 430,828. **Rubber Thread.** Fabbriche Riunite Industria Gomma Torino and A. T. Maximoff, both of Turin, Italy.
- 430,890. **Tube.** W. H. Murad, London.
- 431,261. **Adhesive Tape.** U. Gombault and Soc. Industrielle De La Cellulose (S.I.D.A.C.), both of Ghent, Belgium.
- 431,330. **Crease-Resistant Fabric.** Manchester Dyers (1914), Ltd., and W. Watkins, both of Manchester.
- 431,383. **Upholstery.** J. A. Howard, London.
- 431,399. **Treating Textiles.** Filastic, Ltd., London. (J. deF. Murrell, Akron, O., U. S. A.)

CHEMICAL

United States

- 19,750 (Reissue). **Carbon Black Product.** E. Billings, Weston, and H. H. Offutt, Winchester, assignors to Godfrey L. Cabot, Inc., Boston, all in Mass.
- 2,018,313. **Adhesive Composition.** E. A. Murphy, Birmingham, F. T. Purkis, Moseley, and D. F. Twiss, Wyld Green, assignors to Dunlop Rubber Co., Ltd., Birmingham, all in England.
- 2,018,492. **Plastic Composition.** H. L. Grupe, Scotia, and R. H. Kienle, Schenectady, both in N. Y., assignors to General Electric Co., a corporation of N. Y.
- 2,018,643. **Plasticizing Rubber.** I. Williams, Woodstown, and C. C. Smith, Carneys Point, both in N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.
- 2,018,644. **Plastic Rubber Product.** I. Williams, Woodstown, and C. C. Smith, Carneys Point, both in N. J.,

- assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.
- 2,018,645. **Rubber Cement.** I. Williams, Woodstown, and C. C. Smith, Carneys Point, both in N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.
- 2,018,678. **Rubber Isomerization.** W. E. Lawson, Woodbury, N. J., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del.
- 2,019,055. **Granulated Rubber.** R. J. Noble, Malden, assignor to Heveatex Corp., Melrose, both in Mass.
- 2,019,207. **Vulcanized Rubber Solution.** W. Alexander, Hamburg, Germany.
- 2,019,239. **Latex Composition.** D. F. Twiss and E. W. B. Owen, both of Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.
- 2,020,051. **Accelerator.** S. M. Evans, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.
- 2,020,076. **Chlorinated Rubber.** E. Möllney, assignor to Chemische Fabrik Buckau, both of Ammendorf, Germany.
- 2,020,291. **Age Resister.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
- 2,020,690. **Accelerator.** W. M. Lauter, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
- 2,021,046. **Devulcanizing Rubber.** C. H. Campbell, Kent, O.
- 2,021,063. **Resin-Rubber Composition.** J. P. Henharen, Durban, Union of South Africa.
- Dominion of Canada**
- 353,730. **Carbon Black.** H. W. Grote, Charleston, W. Va., U. S. A.
- 353,811. **Creaming Latex.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. McGavack, Leonia, N. J., U. S. A.
- 353,812. **Latex Purification.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. McGavack, Leonia, N. J., U. S. A.
- 354,103. **Carbon Black Dispersion.** Dewey & Almy Chemical Co., No. Cambridge, assignee of C. W. Tucker, No. Andover, administrator of the estate of G. R. Tucker, deceased, No. Andover, all in Mass., U. S. A.
- 354,142. **Accelerator.** R. C. Goodwin, Lubbock, Tex., co-inventor, and B. F. Goodrich Co., New York, N. Y., assignee of A. W. Sloan, Akron, O., co-inventor with the said R. C. Goodwin, all in the U. S. A.
- United Kingdom**
- 430,798. **Rubber Composition.** A. L. Hock and P. Spence & Sons, Ltd., both of Manchester.
- 430,872. **Latex and Starch.** Naamlooze Vennootschap Chemische Fabriek Servo and M. D. Rozenbroek, both of Delden, Holland.
- 430,887. **Rubber Treatment.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.
- Cleveland, and H. W. Schultz, Lakewood, assignors to Ohio Rubber Co., Cleveland, all in O.
- 2,015,592. **Valve Stem.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.
- 2,015,603. **Abrasive Surface Cleaner.** C. A. Maris, Indianapolis, Ind., assignor of $\frac{1}{2}$ to G. P. Kimmel, Washington, D. C.
- 2,015,608. **Elastic Stocking.** C. E. Southwick, Jr., Camden, N. J., assignor to William H. Horn & Bro., Inc., Philadelphia, Pa.
- 2,015,614. **Flush Tank Bulb.** J. C. Burnes, Eddystone, Pa.
- 2,015,622. **Doorstop.** A. Evulich, Oakland, Calif.
- 2,015,636. **Storage Battery Plate.** J. A. Hamilton, assignor to Electric Storage Battery Co., both of Philadelphia, Pa.
- 2,015,673. **Mechanical Pencil.** P. S. Hauton, Atlanta, Ga.
- 2,015,683. **Track for Tracklaying Vehicles.** H. A. Knox, Davenport, Iowa, and C. Hiller, Jr., St. Louis, Mo.
- 2,015,710. **Plug Switch.** E. S. Cornell, Evanston, and C. A. Koerner, Chicago, assignors to Delta-Star Electric Co., Chicago, all in Ill.
- 2,015,714. **Cable.** W. A. Del Mar, Greenwich, Conn., assignor to Habirshaw Cable & Wire Corp., New York, N. Y.
- 2,015,746. **Battery Container.** L. A. Doughty, Glenside, Pa., assignor to Carlile & Doughty, Inc., a corporation of Pa.
- 2,015,764. **Shoe Press Air Control Mechanism.** J. F. Smith, Quincy, Mass., assignor to Compo Shoe Machinery Corp., New York, N. Y.
- 2,015,831. **Grease Seal.** J. R. Winter, Detroit, Mich.
- 2,015,848. **Curtain Fixture.** W. S. Hamm, Elkhart, Ind., assignor to Adlake Co., Chicago, Ill.
- 2,015,882. **Tire Inflator.** O. G. Brewer, St. Marys, Mo.
- 2,015,911. **Gasoline Tractor.** W. Schroeder, assignor to Mercury Mfg. Co., both of Chicago, Ill.
- 2,015,920. **Retractable Landing Gear.** F. R. Canney, assignor to Boeing Airplane Co., both of Seattle, Wash.
- 2,015,923. **Hose Valve and Nozzle.** H. G. Davis, Denver, Colo.
- 2,016,004. **Electric Cable Installation.** F. W. Gay, Newark, N. J., assignor to General Cable Corp., New York, N. Y.
- 2,016,054. **Pneumatic Mattress.** M. D. Sentell, Chattanooga, Tenn.
- 2,016,067. **Well Driller.** C. E. Bannister, Akron, O.
- 2,016,074. **Tire Valve Core.** J. Continenza, St. Paul, Minn.
- 2,016,077. **Casing Protector.** H. R. Decker, Houston, assignor of $\frac{1}{2}$ to M. E. Stewart, Harris County, both in Tex.
- 2,016,095. **Tire.** J. V. Martin, Martindale, Garden City, N. Y.
- 2,016,108. **Dry Cell.** L. E. Girard, assignor to Burgess Battery Co., both of Madison, Wis.
- 2,016,110. **Golf Ball Cleaner.** O. E. Heisser, Minocqua, Wis.
- 2,016,126. **Necktie.** S. L. Starkey, Parkersburg, W. Va.
- 2,016,137. **Fireman's Protector.** F. J. de Javannes, New York, N. Y.
- 2,016,140. **Belt.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
- 2,016,142. **Windshield Wiper Control-**
- ler.** W. C. Hansen, Detroit, and E. F. Webb, Highland Park, assignors to Chrysler Corp., Detroit, all in Mich.
- 2,016,150. **Tire and Rim Assembly.** R. K. Lee, Highland Park, assignor to Chrysler Corp., Detroit, both in Mich.
- 2,016,154. **Resilient Coupling.** W. C. McWhirter, Wilkinsburg, assignor to Union Switch & Signal Co., Swissvale, both in Pa.
- 2,016,161. **Artificial Silk Filtercandle.** M. Wilderman, Monte Carlo, Monaco, assignor to American Wilderman Porous Ebonite Co., Inc., Philadelphia, Pa.
- 2,016,162. **Porous Diaphragm.** M. Wilderman, Monte Carlo, Monaco, assignor to American Wilderman Porous Ebonite Co., Inc., Philadelphia, Pa.
- 2,016,163. **Filter.** M. Wilderman, Monte Carlo, Monaco, assignor to American Wilderman Porous Ebonite Co., Inc., Philadelphia, Pa.
- 2,016,168. **Elastic Fabric.** D. M. Clark, Worcester, Mass.
- 2,016,175. **Garment Supporter Clasp.** J. R. Parker, assignor of $\frac{1}{2}$ to F. P. Higgins, both of Toronto, Ont., Canada.
- 2,016,178. **Sole and Heel.** C. M. Riddock, Andover, assignee of $\frac{1}{2}$ to M. H. Rourke, Boston, both in Mass.
- 2,016,183. **Float Valve.** J. J. Stefancin, Kingston, Pa.
- 2,016,192. **Button and Loop Clasp.** O. Dohren, Springfield Gardens, N. Y.
- 2,016,193. **Thermometer Housing for Thermohydrometers.** L. Edelmänn, assignor to E. Edelmänn & Co., both of Chicago, Ill.
- 2,016,215. **Orthopedic Shoe Heel.** J. Pietzuch, St. Louis, Mo.
- 2,016,266. **Undergarment.** G. F. Earnshaw, assignor to Earnshaw Knitting Co., both of Newton, Mass.
- 2,016,305. **Torque Transmitting Device.** E. A. Wales, Cleveland, O., assignor to Raybestos-Manhattan, Inc., Bridgeport, Conn.
- 2,016,312. **Rubber Label.** V. H. Bodle, Newton, Mass., assignor to Hood Rubber Co., Inc., New York, N. Y.
- 2,016,404. **Pavement Joint Packing.** L. E. Warner, Oakland, Calif., assignor, by mesne assignments, to Construction Materials Patents, Inc., a corporation of O.
- 2,016,412. **Toilet Silencer Pad.** B. Wind-ing, Reno, Nev.
- 2,016,498. **Drain Cleaner.** A. F. Hope-well, Ottawa, Ont., Canada.
- 2,016,516. **Undergarment.** P. H. Robbins, assignor to Poirrette Corsets, Inc., both of New York, N. Y.
- 2,016,527. **Adhesive Strip Storer and Affixer.** W. Voigt, assignor to Kalle & Co. A. G., both of Wiesbaden-Biebrich, Germany.
- 2,016,586. **Pneumatic Pressure Gage.** J. H. Becker, San Francisco, assignor to Decora Mfg. Co., Inc., Richmond, both in Calif.
- 2,016,711. **Record Sheet Feeder.** E. A. Ford, Scarsdale, assignor to International Business Machines Corp., New York, both in N. Y.
- 2,016,715. **Eraser.** C. C. Harris, Orange, Mass.
- 2,016,776. **Wheel and Tire Assembly.** D. M. Goodrich, Mt. Kisco, N. Y.
- 2,016,828. **Wheel.** N. R. Brownier, assignor to Timken-Detroit Axle Co., both of Detroit, Mich.
- 2,016,830. **Hydrometer Syringe Nozzle.** L. Edelmänn, assignor to E. Edelmänn & Co., both of Chicago, Ill.

GENERAL United States

- 2,015,574. **Transfusion Device.** P. A. Webb, Pittsburgh, Pa.
- 2,015,582. **Mop Holder.** R. J. Badgley, Converse, Ind.
- 2,015,590. **Terminal.** G. F. Cavanagh,

- 2,016,876. **Rug.** F. W. Stolzenberg, Shelton, Conn., assignor to Sidney Blumenthal & Co., Inc., New York, N. Y.
- 2,016,897. **Overall Garment.** C. C. Garrett and E. A. Lockwood, assignors to High Point Overall Co., all of High Point, N. C.
- 2,016,916. **Battery Container.** R. A. Wentworth, Waltham, and R. E. McCurdy, Wellesley, assignors to Hood Rubber Co., Inc., Watertown, Mass.
- 2,016,951. **Dental Cleanser and Massager.** H. L. Welker, Williamsport, Pa.
- 2,016,987. **Mowing Machine.** M. E. Cheadle, Auckland, New Zealand.
- 2,016,990. **Girdle.** S. Davis, New York, N. Y.
- 2,016,997. **Draining Cock.** F. Hartke, assignor to Saureschutz-Gesellschaft m. b. H., both of Berlin-Altglienicke, Germany.
- 2,016,998. **Straight Way Cock.** F. Hartke, assignor to Saureschutz-Gesellschaft m. b. H., both of Berlin-Altglienicke, Germany.
- 2,017,007. **Packing.** W. Liedle, Cannstatt, Germany, assignor, by mesne assignments, to Detroit Gasket & Mfg. Co., Detroit, Mich.
- 2,017,013. **Fastener.** W. Öhrström, assignor to Aktiebolaget Novitas, both of Stockholm, Sweden.
- 2,017,050. **Diaper.** D. B. Kennard, Tallahassee, Fla.
- 2,017,088. **Article Holder.** H. Bihler, Akron, O.
- 2,017,109. **Fountain Pen.** M. G. Sypher, Belleville, N. J., assignor to Chilton Pen Co., Inc., Long Island City, N. Y.
- 2,017,110. **Fountain Pen.** H. J. Upton, W. Medford, Mass., assignor, by mesne assignments, to Chilton Pen Co., Inc., Long Island City, N. Y.
- 2,017,149. **Rope Sheave.** H. B. Greening, assignor to Galloway Engineering Co., Ltd., both of Hamilton, Ont., Canada.
- 2,017,158. **Tire Inflator.** A. C. Mosser and J. F. Methard, Detroit, Mich.
- 2,017,214. **Multiple Tube Tire and Indicator.** S. Libo, Milwaukee, Wis.
- 2,017,219. **Tubing Head.** E. J. Roach, assignor to Beaumont Iron Works Co., both of Beaumont, Tex.
- 2,017,280. **Primary Battery Gas Electrode.** G. W. Heise, N. Olmsted, and E. A. Schumacher, Lakewood, both in O., assignors to National Carbon Co., Inc., a corporation of N. Y.
- 2,017,334. **Suppository Holder.** E. Ackerman, Woodmere, N. Y.
- 2,017,377. **Molding.** R. C. Schemmel, Union City, Ind.
- 2,017,419. **Cushioning Device.** J. Mercier, Neuilly-sur-Seine, France.
- 2,017,435. **Pressure Gage.** V. Ey, New York, N. Y.
- 2,017,511. **Window Frame Channel.** B. L. Prentice, Cleveland Heights, assignor to Reid Products Co., Cleveland, both in O.
- 2,017,519. **Terminal Insulator.** R. C. Waldron, Clifton, assignor to Okonite Co., Passaic, both in N. J.
- 2,017,556. **Window Glass Runway.** F. J. Westrope, Detroit, Mich., assignor, by mesne assignments, to Reid Products Co., Cleveland, O.
- 2,017,582. **Tube for Venting Tires.** H. A. Brittain, Akron, O., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.
- 2,017,603. **Bottle Cap and Applicator.** G. A. Mengle, assignor to Brockway Sales Co., both of Brockway, Pa.

- 2,017,649. **Cellular Cushion Tire.** J. Brunswick, Boulogne/Seine, France.
- 2,017,706. **Printing Apparatus.** J. S. Wheelwright, Tonbridge, and G. H. Abell, Esher, both in England; said Abell assignor to said Wheelwright.
- 2,017,780. **Horse Cleaner.** F. Walters, Parkstone, England.

Dominion of Canada

- 353,262. **Storage Battery.** Willard Storage Battery Co., Cleveland, assignee of W. L. Reinhardt, Shaker Heights, both in O., U. S. A.
- 353,293. **Horse Collar.** P. Boulianne, Valrita, Ont.
- 353,296. **Footwear.** J. E. M. Cooke, London, England.
- 353,340. **Molding Press Diehead.** Canadian Industries, Ltd., Montreal, P. Q., assignee of L. W. Vinal, Leominster, Mass., U. S. A.
- 353,362. **Athletic Supporter.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of J. T. Jordan, Chicago, Ill., U. S. A.
- 353,364. **Sanitary Napkin and Belt.** Johnson & Johnson, Ltd., Montreal, P. Q., assignee of R. P. Hayden, New Brunswick, N. J., U. S. A.
- 353,389. **Tire.** Wingfoot Corp., Wilmington, Del., assignee of H. A. Brittain, Akron, O., both in the U. S. A.
- 353,396. **Undergarment.** S. L. Berger, Newton Centre, Mass., U. S. A.
- 353,397. **Undergarment.** L. Levenson, Mt. Vernon, N. Y., and S. L. Berger, Newton Centre, Mass., co-inventors, both in the U. S. A.
- 353,398. **Tire Tread.** N. E. Jersey, Bucyrus, and R. S. Spencer, Massillon, co-inventors, both in O., U. S. A.
- 353,427. **Ice Creeper for Rubbers.** R. Poulin, St.-Georges de Beauce, P. Q.
- 353,501. **Shoe.** F. P. Wagner, inventor, and A. J. Brauer, assignee of $\frac{1}{2}$ of the interest, both of St. Louis, Mo., U. S. A.
- 353,521. **Dry Cell.** C. P. Deibel, Lakewood, O., U. S. A.
- 353,533. **Eraser Cleaner.** G. Marion, Edmonton, Alta.
- 353,534. **Tire Traction Tread.** R. J. Mitchell, Toronto, Ont.
- 353,537. **Window.** J. D. Phillips, Spokane, Wash., U. S. A.

United Kingdom

- 428,750. **Penwiper.** P. A. Lioberes, Barcelona, Spain.
- 428,755. **Buckle.** J. Anderson, Stockholm, Sweden.
- 428,783. **Brassiere.** Z. M. Richards, London.
- 428,829. **Vehicle Spring Suspension.** Ing. h.c. F. Porsche Ges., Stuttgart, Germany.
- 428,849. **Wire Resistance.** E. Flickschu, Berlin, Germany.
- 428,861. **Tumbler Switch.** J. A. Crabtree, Sutton Coldfield.
- 428,870. **Cable Joint.** Edison Swan Cables, Ltd., London, and F. Gale, Ross.
- 428,883. **Tire Valve.** Firestone Tyre & Rubber Co., Ltd., Brentford, assignee of G. W. Becker.
- 428,898. **Fastening.** Fairey Aviation Co., Ltd., Hayes, and V. Hagger, London.
- 428,918. **Vehicle Spring Suspension.** J. P. Peugeot and Soc. Anon. Des Automobiles Peugeot, both of Paris, France.
- 428,921. **Tire Gaiter.** H. Hurlimann, St. Gallen, Switzerland.
- 428,930. **Tumbler Switch.** J. A. Crabtree, Sutton Coldfield.
- 428,966. **Railway Vehicle Buffer and Drawgear.** A. Spencer and G. Spencer Moulton & Co., Ltd., both of Westminster.
- 428,970. **Water Carbonator.** W. Bosmann Sodator Apparatebau Ges., Berlin, Germany.
- 428,985. **Eye Shade.** F. G. Mitchell, Chingford.
- 428,991. **Tap Washer.** H. Cohen, Montreal, Canada.
- 429,011. **Sports Ground.** All Weather Bowling Greens, Ltd., and J. W. Disley, both of Manchester.
- 429,049. **Respiratory Appliance.** J. Doms, Leloup Spa, Belgium.
- 429,059. **Massage Apparatus.** A. D. Rawlings, London.
- 429,074. **Receipt Checker.** C. A. Varnon and A. J. Caley & Son, Ltd., both of Norwich.
- 429,089. **Vehicle Spring Suspension.** Daimler-Benz A. G., Stuttgart, Germany.
- 429,154. **Lace.** Doguin Soc. Anon., Rhone, France.
- 429,157. **Insole.** J. Muller, Prague, Czechoslovakia.
- 429,168 and 429,169. **Motor Vehicle.** L. M. Ballamy, London.
- 429,193. **Driving Gear.** G. Constantinesco, Coniston.
- 429,248. **Vehicle Lamp.** P. Smith, (trading as Yorkshire Caravan & Trailer Co.), Bawtry.
- 429,272. **Toy Projector.** C. Millar, Leicester.
- 429,276. **Respiratory Apparatus.** R. H. Davis, London.
- 429,307. **Microphone.** F. W. Alexander, London.
- 429,313. **Game.** A. Weinberg, New York, N. Y., U. S. A.
- 429,327. **Baby Soother.** E. J. Everest and A. D. Ingram, both of London.
- 429,396. **Bottle Closure Cap.** Crown Cork & Seal Co., Inc., Baltimore, Md., U. S. A.
- 429,397. **Sifter.** W. Boulton, Ltd., and F. Beardmore, both of Burslem.
- 429,399. **Flushing Valve.** F. Parmiter, Shirley.
- 429,412. **Plate Heat Exchanger.** F. De Boer, Gorredijk, Holland.
- 429,432. **Refrigerator.** C. G. Munters, Stockholm, Sweden.
- 429,438. **Ball.** G. W. Beldam, Farnham.
- 429,450. **Ground Rope Roller.** J. Brighthouse, Aberdeen, Scotland.
- 429,462. **Suspenders.** J. Truatsch-Schwarz, Graubunden, Switzerland.
- 429,468. **Hinge.** G. W. P. Johnston, Sutton.
- 429,483. **Target.** W. Wright, Ashford.
- 429,486. **Electro-medical Appliance.** E. Last, Vienna, Austria.
- 429,495. **Juice Extractor.** H. F. Magnus, London.
- 429,499 and 429,500. **Refrigerator.** C. G. Munters, Stockholm, Sweden.
- 429,502. **Sifter.** J. Speight, Felixstowe, and H. Simon, Ltd., Chaddle Heath.
- 429,508. **Liquid Distributing Can.** H. L. Clarke, Stoke.
- 429,514. **Fruit Stoner.** D. J. Allardice and H. S. Whiteside, both of London.
- 429,527. **Rowing Exerciser.** A. V. Terry, Redditch.
- 429,528. **Seat.** I. C. Tyler, London.
- 429,532. **Draught Excluder.** Potter Rax Gate Co., Ltd., and F. G. Coleman, both of London.
- 429,541. **Bathing Cap.** K. Hart, Bexhill-on-Sea.
- 429,550. **Stocking.** O. Kunze, Saxony, Germany.

- 429,555. **Camera.** E. E. Lee, Hollywood, Calif., U. S. A.
- 429,571. **Hat.** E. Hasenburg, Ostrau, Czechoslovakia.
- 429,573. **Paving Block.** Soc. Italiana Pirelli, Milan, Italy.
- 429,579. **Milk Cooler.** C. E. Ellison, Norrköping, assignee of Karlsson, Forslund & Co., Söderköping, both in Sweden.
- 429,585. **Cable.** Norddeutsche Seekabelwerke A. G., Nordenham, Germany.
- 429,603. **Writing Pad.** Calendox, Ltd., and H. C. Hanrott, both of London.
- 429,609. **Bottle Capper.** C. Riesebeck, Berlin, Germany.
- 429,611. **Cable Joint.** Standard Telephones & Cables, Ltd., and J. K. Webb, both of London.
- 429,627. **Spring Suspension.** L. M. Ballamy, London.
- 429,639. **Battery Coop.** W. C. C. Sykes, Horsham, and Cope & Cope, Ltd., Reading.
- 429,646. **Sleeping Cap.** G. Hartley-Sharp, Harrogate.
- 429,652. **Mop.** C. J. Axten and A. T. Long, both of Hook.
- 429,663. **Printing Machine.** H. Horn, Dresden, Germany.
- 429,666. **Golf Club.** C. A. Viriot, Paris, France.
- 429,677. **Powder Puff.** L. Kupfer, Zurich, Switzerland.
- 429,688. **Toy Wheel.** F. C. Gordon-Lennox, London.
- 429,702. **Lawn Trimmer.** E. Hipkiss and W. Cripps, both of Birmingham.
- 429,712. **Spring.** Siemens-Schuckertwerke A. G., Berlin, Germany.
- 429,723. **Resilient Mounting.** Askania Werke A. G., Vorm. Central-Werkstatt Dessau Und C. Bambergfriedenaue, Berlin, Germany.
- 429,740. **Sound Recorder and Reproducer.** Naamlooze Vennootschap Philips' Gloeilampenfabrieken, Eindhoven, Holland.
- 429,749. **Piston Packing.** Hydraulic Brake Co., Detroit, Mich., U. S. A.
- 429,766. **Joint Packing.** E. Schnabel, Berlin, Germany.
- 429,773. **Floor Sweeper.** B. E. Bradnack, Rushall.
- 429,780 and 429,781. **Reciprocating Saw Machine.** W. H. Young, Detroit, Mich., U. S. A.
- 429,813. **Bottle Stopper.** E. Schupbach, Berne, Switzerland.
- 429,823. **Surgical Appliance.** F. Schmidt, Duisburg, Germany.
- 429,824. **Gas Mask.** J. Stapelfeldt, Lübeck, and H. Stoltzenberg, Hamburg, both in Germany.
- 429,859. **Bookbinding.** A. A. Fortier, Paris, France.
- 429,860. **Hair Waver.** Cada Co., Inc., New York, N. Y., U. S. A.
- 429,861. **Window Packing Strip.** J. E. Waber, Vienna, Austria.
- 429,864. **Electric Hand Lamp.** J. Kros, Frankfurt a. M., Germany.
- 429,885. **Battery.** K. A. Hillyers, London.
- 429,888. **Railway Wheel.** A. Huguenin, Zurich, Switzerland.
- 429,892. **Bathing Cap.** G. W. Winkler, Haarlem, Holland.
- 429,901. **Suspensory Bandage.** J. V. Amendola, Kenosha, Wis., U. S. A.
- 429,941. **Plug Cock.** F. J. T. Barnes, Newstead, Brisbane, Australia.
- 429,945. **Stuffing Box Packing.** Telefonaktiebolaget L. M. Ericsson, Stockholm, Sweden.
- 429,978. **Pipe Joint.** J. Lane & Sons, Ltd., and E. A. Cliff, both of Manchester.
- 429,981. **Tire.** M. Flaherty and F. Kelly, both of Galway, and J. Cope-land, Dublin, all in the Irish Free State.
- 430,056. **Dustpan.** A. W. Leigh, London.
- 430,062. **Driving Belt.** Wingfoot Corp., Akron, O., U. S. A.
- 430,067. **Envelope.** A. G. S. Lindgren, Gothenburg, Sweden.
- 430,131. **Catamenial Appliance.** Johnson & Johnson (Gt. Britain), Ltd., Slough. (Johnson & Johnson, New Brunswick, N. J., U. S. A.)
- 430,132. **Window Holder.** J. A. Flanagan, Moyvalley, Irish Free State.
- 430,165. **Roller.** Ioco Rubber & Waterproofing Co., Ltd., and A. Ryan, both of Glasgow, Scotland.
- 430,172. **Valve.** F. J. T. Barnes, Newstead, Brisbane, Australia.
- 430,175. **Wash Basin Tap.** S. W. Bostel and Bostel Bros., Ltd., both of Brighton.
- 430,177. **Printing Machine.** L. Smith and Parcelads, Ltd., both of London.
- 430,231. **Face Covering.** M. Ritchie, Liverpool.
- 430,232. **Air Douche.** British Thomson-Houston Co., Ltd., London.
- 430,259. **Pulp Treatment.** J. S. Pou, Barcelona, Spain.
- 430,261. **Tire.** Dunlop Rubber Co., Ltd., London, and E. W. Madge, F. B. Jones, and D. Parkinson, all of Birmingham.
- 430,273. **Recording Apparatus.** International Business Machines Corp., New York, N. Y., U. S. A.
- 430,291. **Massage Device.** F. Godfrey, Matlock.
- 430,371. **Printing Machine.** H. T. Backhouse, London.
- 430,495. **Ironing Press.** Cherry Tree Machine Co., Ltd., and G. Dowell, both of Blackburn.
- 430,519. **Pipe Supporter.** Mersey Insulation Co., Ltd., and J. F. Breen, both of Liverpool.
- 430,527. **Pipe Joint.** Lead Wool Co., Ltd., and F. Moulton, both of Kent.
- 430,545. **Driving Belt.** Soc. Anon. Etablissements Flinois, Colmant & Cuvelier, Colmant & Cuvelier Successeurs, Tournai, Belgium.
- 430,622. **Sand Blast Nozzle.** Deutsche Edelstahlwerke A. G., Krefeld, Germany.
- 430,681. **Printing Machine.** S. Tchechonin, Paris, France.
- 430,687. **Abrasive Wheel.** P. R. Lundqvist, Falun, Sweden.
- 430,692. **Braid.** E. Krenzler, Barmen, Germany.
- 430,712. **Tooth and Massage Brush.** E. L. H. Cosby, London.
- 430,775. **Massage Device.** W. A. Hardman, Brooklyn, N. Y., U. S. A.
- 430,851. **Flexible Hinge.** Andre (Silentbloc), Ltd., and S. W. Jelley, both of London.
- 430,918. **Flexible Hinge.** H. C. Lord, Erie, Pa., U. S. A.
- tape and splicing compound. Jenkins Bros., New York, N. Y.
- 328,330. **Solvenol.** Terpene hydrocarbon solvent for rubber processing and cleaning compounds, etc. Hercules Powder Co., Wilmington, Del.
- 328,336. **Durofi.** Golf balls. Dunlop Rubber Co., Ltd., Birmingham, England.
- 328,354. **Fleetwood.** Tires and tubes. Pharis Tire & Rubber Co., Newark, O.
- 328,389. **Anode.** Rubber-coated switch levers, armatures, thermocouples, and battery boxes. B. F. Goodrich Co., New York, N. Y., doing business as Miller Rubber Products Co., Akron, O.
- 328,445. **Hydraulic.** Golf balls. Worthington Ball Co., Elyria, O.
- 328,451. Representation of a hand holding a stocking protector against the heel of a foot. Stocking protector. Scholl Mfg. Co., Inc., Chicago, Ill.
- 328,461. **Osto.** Surgical belts. I. F. Spindell, doing business as Spindell Surgical Co., Lynn, Mass.
- 328,476. **Yankymaid.** Hot water bottles and syringes. Faultless Rubber Co., Ashland, O.
- 328,485. **Spatzies.** Anklets. Everlastik, Inc., Chelsea, Mass.
- 328,506. **Lozben.** Offset lithographing rubber blanket cleaning solution. Sanlin Offset Press Mfg. Corp., New York, N. Y.
- 328,514. Circle containing representation of Mercury's head, and the words: "With Speed and Certainty . . ." Surgical rubber goods, etc. Will Ross, Inc., Milwaukee, Wis.
- 328,528. **Swank.** Belts, suspenders, and garters. Baer & Wilde Co., Attleboro, Mass.
- 328,534. **The New Dream Figure.** Brassieres, foundation garments, garters, belts, etc. Sho-Form Brassiere, Inc., Los Angeles, Calif.
- 328,557. **Thintex.** Baby pants and bibs. Rand Rubber Co., Inc., Brooklyn, N. Y.
- 328,731. **Streamline.** Golf balls. Stowe-Woodward, Inc., Newton Upper Falls, Mass.
- 328,732. **Saxon.** Adhesive plaster and tape, etc. Forest City Rubber Co., Cleveland, O.
- 328,789. **A Tarzan Product.** Golf balls, tennis balls, etc. Edgar Rice Burroughs, Inc., Tarzana, Calif.
- 328,800. Black circle broken in half by the words: "Super X." Golf balls. Bloomingdale Bros., Inc., New York, N. Y.
- 328,801. **X Double X.** Golf balls. Bloomingdale Bros., Inc., New York, N. Y.
- 328,814. Representation of a portrait of Shirley Temple, and the words: "Shirley Temple." Dolls, dolls' costumes, parts of costumes, and wigs. Ideal Novelty & Toy Co., Brooklyn, N. Y.
- 328,820. **Ustrub.** Assembled electrical conductors. United States Rubber Products, Inc., New York, N. Y.
- 328,870. Word: "Rainfair;" the letters "A" and "I" in each word are blackened to designate the word "AI." Wearing apparel. Chicago Rubber Clothing Co., Racine, Wis.
- 328,887. **Porolace.** Elastic braids. Narrow Fabric Co., W. Reading, Pa.
- 329,168. Label containing the words: "We fix flats Bowes Seal Fast." Portable tire and tube repair kits. Bowes Seal Fast Corp., Indianapolis, Ind.

TRADE MARKS

United States

- 328,300. **Lighthouse.** Engine and machinery packings. Beldam Packing & Rubber Co., Ltd., London, England.
- 328,301. **Excelite.** Engine and machinery packings. Beldam Packing & Rubber Co., Ltd., London, England.
- 328,316. Representation of a roll of tape from which are emanating friction flashes, and the words: "Gold Seal." Friction and rubber insulating

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Crude Rubber
Liquid Latex
Carbon Black
Clay

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Classified Advertisements

Continued

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SCRAP RUBBER
CRUDE RUBBER
HARD RUBBER DUST

(Advertisements continued on page 85)

Rubber Goods Production Statistics

	1935	1934
TIRES AND TUBES*		
Pneumatic casings		
Production.....thousands	3,067	2,848
Shipments, total.....thousands	2,876	3,087
Domestic.....thousands	2,621	2,993
Stocks, end of month.....thousands	6,713	8,166
Solid and cushion tires		
Production.....thousands	24	15
Shipments, total.....thousands	20	13
Domestic.....thousands	19	13
Stocks, end of month.....thousands	37	34
Inner tubes		
Production.....thousands	3,341	3,017
Shipments, total.....thousands	2,775	2,934
Domestic.....thousands	2,735	2,871
Stocks, end of month.....thousands	6,127	7,410
Raw material consumed		
Fabrics.....thous. of lbs.	12,606	12,942
MISCELLANEOUS PRODUCTS		
Rubber bands, shipments.....thous. of lbs.	269	231
Rubber-proofed fabrics, production, total.....thous. of yds.	4,742	4,742
Auto fabrics.....thous. of yds.	396	568
Raincoat fabrics.....thous. of yds.	2,405	2,405
Rubber flooring, shipments.....thous. of sq. ft.	431	339
Rubber and canvas footwear		
Production, total.....thous. of prs.	4,427	3,918
Tennis.....thous. of prs.	873	877
Waterproof.....thous. of prs.	3,554	3,041
Shipments, total.....thous. of prs.	5,510	6,475
Tennis.....thous. of prs.	889	920
Waterproof.....thous. of prs.	4,622	5,555
Shipments, domestic, total.....thous. of prs.	5,489	6,412
Tennis.....thous. of prs.	881	866
Waterproof.....thous. of prs.	4,608	5,547
Stocks, total, end of month.....thous. of prs.	14,559	15,701
Tennis.....thous. of prs.	4,137	5,841
Waterproof.....thous. of prs.	10,422	10,017
Rubber heels		
Production.....thous. of prs.	16,406	13,911
Shipments, total.....thous. of prs.	17,067	13,219
Export.....thous. of prs.	187	219
Repair trade.....thous. of prs.	4,079	4,079
Shoe manufacturers.....thous. of prs.	11,694	8,921
Stocks, end of month.....thous. of prs.	36,051	42,652
Rubber soles		
Production.....thous. of prs.	3,021	2,952
Shipments, total.....thous. of prs.	3,160	3,107
Export.....thous. of prs.	3	2
Repair trade.....thous. of prs.	660	455
Shoe manufacturers.....thous. of prs.	2,497	2,650
Stocks, end of month.....thous. of prs.	3,844	4,718
Mechanical rubber goods, shipments		
Total.....thous. of dollars	3,187	3,187
Belting.....thous. of dollars	846	846
Hose.....thous. of dollars	1,138	1,138
Other.....thous. of dollars	1,203	1,203

*Data for 1934 are estimated to represent approximately 97% of the industry.

Source: Survey of Current Business, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Customs House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
9,722	Elastic thread.....	Santiago, Chile
9,777	Rubber tiles, tile cement, and matting.....	Colombo, Ceylon
9,785	Vacuum brake hose and rubber matting machinery.....	Birmingham, England
9,788	Machinery for reclaiming rubber from old tires.....	Ponce, Porto Rico
19,869	Hose, transmission belting, floorings, mats, gloves, surgical goods, household articles, and novelties.....	Amsterdam, Netherlands

*Purchase. †Agency.

Low and High New York Spot Prices

	1935*	December 1934	1933
PLANTATIONS			
No. 1 thin latex crepe.....	13 1/4/13 1/2	13 1/4/13 1/2	9 7/8/10 3/4
No. 1 ribbed smoked sheet....	12 3/4/13 1/4	12 3/4/13 1/2	8 1/2/9 1/4
PARAS			
Upriver fine.....	13 1/4/13 1/4	9 1/4/9 1/4	9 / ..

*Figured to December 26, 1935. All prices in cents per pound.

London Stocks, October, 1935

	Landed Tons	De-livered Tons	Stocks, October 31	1935	1934	1933
LONDON						
Plantation.....	4,775	11,208	194,710	63,017	63,017	37,081
Other grades.....	4	20	39	62	62	20
LIVERPOOL						
Plantation.....	*2,371	*2,234	*76,400	*57,818	*57,818	*52,606
Total tons, London and Liverpool.....	7,150	13,462	†171,149	120,897	120,897	89,707

*Official returns from the recognized public warehouses.
†Subject to adjustment owing to fire at Colonial Wharf.

Imports by Customs Districts

	October, 1935	October, 1934
	Crude Rubber Pounds	Crude Rubber Pounds
Massachusetts.....	3,964,158	\$447,846
New York.....	63,398,365	7,079,363
Philadelphia.....	185,350	21,993
Maryland.....	1,591,183	178,271
Mobile.....	1,119,034	115,649
New Orleans.....	1,172,081	123,781
Los Angeles.....	9,753,955	1,083,340
San Francisco.....	56,000	6,160
Oregon.....	16,800	1,992
Washington.....	5,600	700
Michigan.....	224,000	25,200
Ohio.....	160	28
Totals.....	81,486,686	\$9,084,323

*Crude rubber including latex dry rubber content.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	8% Pfd.	\$2.00 q.	Jan. 2	Dec. 18
Collyer Insulated Wire Co.	Com.	\$0.15 q.	Jan. 1	Dec. 26
Dominion Rubber Co., Ltd.	Pfd.	\$1.75 q.	Dec. 31	Dec. 26
Firestone Tire & Rubber Co.	Pfd.	\$1.50 q.	Mar. 1	Feb. 15
Firestone Tire & Rubber Co.	Com.	\$0.30 Inc., q.	Jan. 20	Jan. 3
Fisk Rubber Corp.	Pfd.	\$1.50 q.	Jan. 2	Dec. 12
Garlock Packing Co.	Com.	\$0.25 q.	Dec. 31	Dec. 21
Garlock Packing Co.	Com.	\$0.25 Extra	Dec. 31	Dec. 21
General Tire & Rubber Co.	6% Pfd.	\$1.50 q.	Dec. 31	Dec. 20
Goodyear Tire & Rubber Co.	Com.	\$0.63 q.	Jan. 2	Dec. 14
Goodyear Tire & Rubber Co.	Com.	\$0.63 q.	Jan. 2	Dec. 14
Jenkins Bros.	7% Pfd.	\$0.62 1/4 q.	Jan. 2	Dec. 14
Jenkins Bros.	7% Pfd.	\$1.75 Accum.	Dec. 28	Dec. 16
Jenkins Bros.	7% Pfd.	\$1.75 q.	Dec. 28	Dec. 16
Lee Rubber & Tire Corp.	Com.	\$0.25	Feb. 1	Jan. 15
Mid-West Rubber Reclaiming Co.	\$4 Pfd.	\$1.00	Dec. 23	Dec. 16
Plymouth Rubber Co.	Pfd.	\$1.75 q.	Jan. 15	Jan. 2
Rex-Hide, Inc.	Com.	\$0.25 q.	Jan. 15	Dec. 31
Rex-Hide, Inc.	Com.	\$0.25 Extra	Dec. 14	Nov. 30
Thermoid Co.	Com.	\$1.00 Initial	Dec. 14	Nov. 30

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.L.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines and Oceania	South Africa	Mexican Guayule	Grand Total
1933	445,800	282,300	63,800	1,400	3,400	7,800	11,100	7,000	17,300	839,900	1,100*	2,000	0 853,100
1934	467,030	379,401	79,068	5,735	5,719	11,086	17,708	17,714	19,559	1,003,020	1,233*	2,921	398 1,016,715
1935													
Jan.	41,665	18,726	6,294	1,552	945	1,238	1,536	2,614	2,575	77,145	105	467	0 79,502
Feb.	32,824	27,835	5,551	344	489	760	1,880	2,288	2,018	73,989	156	254	0 75,325
Mar.	34,047	22,402	1,720	269	471	773	1,874	2,076	1,440	65,072	82	525	0 66,671
Apr.	37,442	26,156	3,749	250	263	846	1,875	1,661	2,827	75,069	134	185	0 76,534
May	27,740	36,289	4,473	322	484	848	1,977	2,752	1,800	76,685	134	315	50 77,940
June	31,198	29,337	3,525	651	383	603	1,983	2,869	2,516	73,065	142	393	103 74,598
July	37,826	20,990	4,106	351	229	1,164	1,752	1,939	1,957	70,314	125	407	52 71,305
Aug.	40,990	21,154	5,683	732	102	566	776	2,062	3,662	75,727	143	442	50 77,569
Sept.	40,931	20,447	4,053	561	120	421	1,758	2,278	2,248	72,817	120*	500*	17 74,703
Oct.	29,011	27,969	5,932	939	239	1,040	1,722	2,622	2,750	72,244	120*	300*	26* 74,177

*Estimate. Source: Statistical Bulletin of the International Rubber Regulation Committee.

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Classified Advertisements

Continued

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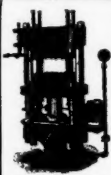
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Chimie et Technologie du latex de Caoutchouc, (400 pages) par Georges GÉNIN	\$6
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Vade Mecum des Accélérateurs de Vulcanisation et des Antioxygènes, par F. JACOBS	\$1

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	September, 1935		Six Months Ended September, 1935	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber, etc.	3,593,662	\$419,170	27,248,466	\$3,098,770
Gutta percha	150	433	10,307	5,830
Rubber, recovered	694,700	33,035	3,624,900	173,683
Rubber, powdered, and gutta percha scrap	179,500	3,549	1,302,300	16,512
Balata	370	246	6,515	1,057
Rubber substitute	39,700	11,890	224,000	66,309
Totals	4,508,382	\$468,323	32,416,488	\$3,362,170
PARTLY MANUFACTURED				
Hard rubber sheets and rods	1,921	\$1,505	14,108	\$10,951
Hard rubber tubes	.....	736	.....	2,568
Rubber thread not covered	3,828	2,404	26,731	17,297
Totals	5,749	\$4,645	40,839	\$30,816
MANUFACTURED				
Hard rubber comb blanks	.....	\$930	.....	\$3,926
Beltung	.....	6,060	.....	46,276
Hose	.....	5,281	.....	42,233
Packing	.....	5,640	.....	31,565
Boots and shoes	49,791	35,212	130,089	69,942
Clothing, including water-proofed	.....	2,235	.....	10,632
Raincoats	670	3,029	4,617	18,358
Gloves	115	410	1,379	3,221
Hot water bottles	.....	4,299	.....	7,948
Liquid rubber compound	.....	.....	.....	5,310
Tires, bicycle	332	206	30,736	13,222
Pneumatic	1,519	13,531	11,879	101,275
Inner tubes	415	897	1,945	4,867
Solid for automobiles and motor trucks	39	1,020	225	6,786
Other solid tires	.....	533	.....	3,884
Mats and matting	.....	6,405	.....	43,843
Cement	.....	7,103	.....	53,956
Golf balls	2,208	6,809	30,137	81,435
Heels	5,286	334	44,126	2,670
Other rubber manufactures	.....	68,251	.....	397,504
Totals	.....	\$168,185	.....	\$948,853
Totals, rubber imports	.....	\$641,153	.....	\$4,341,839

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of For- eign Goods Value	Produce of Canada Value	Reexports of For- eign Goods Value
UNMANUFACTURED				
Waste rubber	\$8,728	.....	\$31,738	.....
MANUFACTURED				
Beltung	\$50,924	.....	\$272,174	.....
Canvas shoes with rubber soles	49,013	.....	652,760	.....
Boots and shoes	289,231	.....	906,751	.....
Clothing, including water-proofed	19,566	.....	109,247	.....
Heels	20,509	.....	101,588	.....
Hose	16,221	.....	87,327	.....
Soles	27,558	.....	118,451	.....
Tires, bicycle	40	.....	56	.....
Pneumatic	453,531	.....	3,275,635	.....
Inner tubes	33,570	.....	227,256	.....
Solid	17	.....	19	.....
Other rubber manufactures	52,610	\$3,298	287,995	\$8,579
Totals	\$1,012,790	\$3,298	\$6,039,259	\$8,579
Totals, rubber exports	\$1,021,518	\$3,298	\$6,070,997	\$8,579

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
1980	Manufacturer of machines for proofing fabrics and making raincoats.
1981	Manufacturer of electric cable making machinery.
1982	Manufacturer of all kinds of rubber machinery, including molds and forms for dipped goods.
1983	Manufacturer of small presses, mills, autoclaves, and three-inch tubers.
1984	Manufacturer of rubber covers for battery terminals.
1985	Manufacturer of expanding devices for fastening metal couplings to fire hose.
1986	Manufacturer of engraving and profiling machines for finishing non-skid tire molds.
1987	Manufacturer of rubber horseshoes.
1988	Manufacturer of machines for cutting tires and rubberized fabric pads for matting.
1989	Manufacturer of non-skid base pads for telephones.
1990	Manufacturer of perforated caps for mucilage bottles.
1991	Supplier of articles made from scrap tire carcasses.
1992	Manufacturer of tire deheading machines.
1993	Manufacturer of fountain pen sacs.
1994	Manufacturer of elastic webbing.
1995	Manufacturer of washing machines for small finished molded rubber goods.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	September, 1935		Nine Months Ended September, 1935	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—Free				
Crude rubber	77,636,846	\$8,637,048	793,892,512	\$90,509,530
Liquid latex	2,347,111	291,652	22,123,595	2,736,030
Jelutong or pontianak	3,767,121	407,418	10,648,953	907,322
Balata	64,387	6,090	1,090,260	150,768
Gutta percha	82,779	21,638	3,225,463	455,605
Guayule	38,400	3,245	609,200	51,475
Scrap and reclaimed, etc.	1,043,438	17,966	5,932,555	75,002
Totals	84,980,082	\$9,385,057	837,522,538	\$94,885,732
Chicle, crude	298,208	\$94,039	4,583,443	\$1,006,727
MANUFACTURED—Dutiable				
Rubber soled footwear with fabric uppers	76,935	\$11,870	666,835	\$170,235
Rubber toys	158,767	21,640	1,650,546	132,365
Druggists' sundries, n. e. s.	.....	3,437	.....	70,019
Combs, hard rubber	108,403	5,963	594,529	33,636
Golf balls	32,472	5,755	508,793	86,700
Tennis and other rubber balls	154,586	4,673	3,047,396	143,788
Tires	4,799	1,431	35,007	70,621
Other rubber manufactures	.....	36,039	.....	321,966
Totals	.....	\$90,808	.....	\$1,029,330

Exports of Foreign Merchandise

	Pounds	Value	Pounds	Value
RUBBER AND MANUFACTURES				
Crude rubber	1,049,436	\$120,438	19,122,867	\$2,270,023
Balata	15,025	3,281	156,202	39,275
Gutta percha, rubber substitutes, and scrap	1,050	146	44,503	7,879
Rubber manufactures	.....	3,716	.....	16,407
Totals	.....	\$127,581	.....	\$2,331,584

Exports of Domestic Merchandise

	Pounds	Value	Pounds	Value
RUBBER AND MANUFACTURES				
Reclaimed	989,779	\$46,691	8,207,547	\$401,726
Scrap	4,840,635	98,672	41,306,840	809,459
Rubberized automobile cloth, sq. yd.	46,431	20,477	415,202	210,378
Other rubberized piece goods and hospital sheeting, sq. yd.	65,361	26,838	773,522	319,622
Footwear	.....	.....	.....	.....
Boots	4,663	8,357	61,680	132,370
Shoes	10,806	5,982	134,413	67,970
Canvas shoes with rubber soles	.....	.....	.....	.....
soles	8,178	4,416	399,621	193,823
Soles	2,038	3,211	20,846	35,015
Heels	29,012	18,019	312,309	181,082
Soling and top lift sheets	30,689	5,620	173,596	31,429
Water bottles and fountain syringes	30,959	10,219	164,079	57,081
Gloves	6,104	13,266	44,404	95,296
Other druggists' sundries	.....	30,276	.....	286,280
Balloons	20,198	17,317	175,205	155,591
Toys and balls	.....	11,747	.....	52,880
Bathing caps	2,429	3,985	45,460	80,126
Bands	19,236	6,854	160,444	55,864
Erasers	34,955	19,399	267,151	148,752
Hard rubber goods	.....	.....	.....	.....
Electrical goods	120,625	13,992	1,320,646	126,821
Other goods	.....	17,747	.....	150,686
Tires	.....	.....	.....	.....
Truck and bus casings	13,165	276,805	135,208	2,481,753
Other automobile casings	58,999	555,625	559,523	4,923,795
Tubes, auto	48,697	75,336	476,260	658,498
Other casings and tubes	4,838	18,708	31,717	126,037
Solid tires for automobiles and motor trucks	364	12,855	3,992	115,166
Other solid tires	69,166	9,404	820,299	114,505
Tire sundries and repair materials	.....	30,549	.....	304,150
Rubber and friction tape	42,239	11,635	425,357	113,397
Beltung	185,454	98,992	1,868,322	932,330
Hose	247,643	79,029	3,060,492	912,514
Packing	138,645	47,311	1,104,128	383,176
Thread	83,644	47,479	846,992	511,506
Other rubber manufactures	.....	99,705	.....	1,200,896
Totals	.....	\$1,746,518	.....	\$16,369,676

No.	INQUIRY
1996	Manufacturer of sponge rubber stripping for car doors.
1997	Manufacturer of tire cord fabrics.
1998	American exporter of raw rubber.
1999	Manufacturer of wood, aluminum, or glass molds for latex dipping.
2000	Manufacturer of chlorinated rubber.
2001	Manufacturer of hydrochloric acid rubber.
2002	Manufacturer of sanitary rubber mats.
2003	Dealers in used hydraulic presses.
2004	Manufacturer of doubled fabrics.
2005	Manufacturer of machinery for making mechanicals.
2006	Manufacturer of Durbin flexible joints.
2007	Manufacturer of an electric knife for cutting sheet gum stock.
2008	Manufacturer of machines for slicing rolls of uncured rubber.
2009	Manufacturer of stamping device for printing rubber disks.

